

## Chapter 6

# RECOMMENDATIONS

### INTRODUCTION

This chapter presents 47 recommendations that have been developed to implement the LEC Regional Water Supply Plan. The preceding chapter identified water source options that form a basis for water resource development projects. Water resource development projects are generally those projects that are beyond the scope of traditional local water supply development efforts. Chapter 5 described water resource development projects for the region and estimated the quantities of water that would be made available. The purpose of this chapter is to provide additional information regarding the resources needed to implement these projects and their expected outputs during the next five years.

Chapter 5 also described a number of water source options that can form a basis for water supply development projects. These options are available to water users to help meet their existing and future water supply needs. This chapter recommends that individual water users in locations where local water supplies are constrained, evaluate these water source options for applicability to their local conditions.

### Water Resource Development Projects

Water resource development projects for the LEC Planning Area are grouped by the scope and nature of the recommended project as follows:

1. Ongoing projects from the *Interim Plan for Lower East Coast Regional Water Supply (LEC Interim Plan)* (SFWMD, 1998b)
2. Other federal, state, and South Florida Water Management District (District, SFWMD) projects
3. Comprehensive Everglades Restoration Plan (CERP) projects
4. Recommendations to the CERP resulting from analysis performed during the *LEC regional water supply planning process*
5. Recommendations to the CERP from the *Caloosahatchee Water Management Plan (CWMP)*
6. Operational recommendations resulting from LEC water supply planning process analysis
7. Consumptive Use Permitting (CUP) and resource protection projects
8. Other Water Resource Development Projects

9. Potential funding sources for these projects are discussed and a funding strategy is proposed. The Governor's proposal for funding CERP projects is subject to legislative action, and a final funding recommendation is deferred pending legislative approval.

At the District level, the recommendations of the final *LEC Regional Water Supply Plan* will be approved by the Governing Board and incorporated into the *Five-Year Water Resource Development Work Program*, which documents the District's progress in water supply plan implementation. It must be submitted to the Florida Department of Environmental Protection (FDEP) annually (before October 1) for review and approval.

The *Five-Year Water Resource Development Work Program* will also be subject to District Governing Board approval and budgetary appropriation each Fiscal Year (FY)<sup>1</sup>. At this time, the implementation schedule for each recommendation has not taken into account other District financial and human resource commitments, as well as commitments that will be generated through approval of the other regional water supply plans currently under development. Thus, schedules identified in the *LEC Regional Water Supply Plan* are subject to change based on future District resource and budgetary constraints.

## Water Supply Development Projects

Water supply development recommendations, or water source options, are provided for consideration by local governments, water users, and utilities, and are principally the responsibility of users. Water supply development projects may be eligible for District funding assistance, if they meet appropriate criteria explained in Section 373.0831 F.S. and the funding section of this chapter. Funding for water supply development projects is contingent upon the priorities of the Governing Board in light of all other resource or budgetary constraints.

## WATER RESOURCE DEVELOPMENT PROJECTS

The water resource development projects are presented in the form of recommendations. Each recommendation, or project, contains a discussion, list of subtasks (if applicable), the cost to non-Federal entities, which will primarily be borne by the District, total District FTEs<sup>2</sup>, funding source(s), and implementing agencies. The costs and FTEs are also broken down by fiscal year and presented in a table.

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1. The District's fiscal year begins on October 1 and ends on September 30.

2. FTE = Full Time Equivalent, which is a worker who works 40 hours each week

## Ongoing Projects from the LEC Interim Plan

Significant water supply planning projects were initiated with the completion of the *LEC Interim Plan*, approved by the Governing Board in March 1998. A number of these projects involve capital expenditures on the part of the District or its partners, and must be continued to completion. The majority of these projects will be concluding prior to the next update of the LEC Regional Water Supply Plan and the five-year projections reflect this fact.

### Recommendation 1: Regional Saltwater Intrusion Management

#### Discussion

The water supply planning process requires that the position of the saltwater interface be monitored and the factors causing its movement to be understood. Historically, the District's objective for monitoring has been more to support the development of ground water flow models than to monitor inland saltwater intrusion. The LEC Interim Plan recommended the existing saltwater intrusion monitoring program be evaluated to ensure its reliability in detecting the movement of saltwater interface and a sampling plan and maintenance schedule be proposed. As a result, six new wells were added to fill data gaps in Palm Beach County. Additional wells and other improvements, plus subsequent data collection have been undertaken cooperatively with Broward and Miami-Dade counties. These improvements should continue and the data should be incorporated into the future LEC planning analyses, including additional ground water modeling for the 2025 *LEC Regional Water Supply Plan* Update. The status of the monitoring network will be reassessed during the *LEC Regional Water Supply Plan* update and further improvements may be considered at that time.

The minimum Biscayne aquifer ground water levels which can be sustained without causing significant harm to the aquifer through saltwater intrusion are difficult to predict. Therefore, as recommended in the *Draft Minimum Flows and Levels for Lake Okeechobee, the Everglades, and the Biscayne Aquifer* (SFWMD, 2000e), further research will be conducted to refine the relationship between saltwater migration and stage elevations in the Biscayne aquifer. Additionally, a detailed model will be developed that can adequately simulate movement of the saline interface under transient conditions.

In addition, CERP's RECOVER

may develop updated

surface and groundwater flows for Biscayne Bay and Florida Bay that relate to ground water levels and saltwater intrusion. Aquifer monitoring associated with CERP may be eligible for federal cost sharing in future years.

### **Subtasks**

Task 1a. Monitor new network

Task 1b. Develop model to simulate the movement of the saline interface

### **Summary Information**

Cost: \$973,000 over the first five years; \$2,280,000 over the next 15 years

FTEs: 2.0 for the first five years

Funding Source: SFWMD with local cost sharing by counties

Implementing Agency: SFWMD

**Table 72.** Estimated Schedule and Costs for Regional Saltwater Intrusion Management for the Biscayne Aquifer.

| Recommendation<br>Subtasks |                     | Plan Implementation Costs (\$1,000s and FTEs) |     |      |     |      |     |      |     |      |     |                 |     |                  |     |
|----------------------------|---------------------|---|-----|------|-----|------|-----|------|-----|------|-----|-----------------|-----|------------------|-----|
|                            |                     | FY01  |     | FY02 |     | FY03 |     | FY04 |     | FY05 |     | Total<br>2001-5 |     | Total<br>2006-20 |     |
|                            |                     | \$  | FTE | \$   | FTE | \$   | FTE | \$   | FTE | \$   | FTE |                 |     |                  | FTE |
| a                          | Monitor new network | 130   | .1  | 135  | .1  | 140  | .1  | 146  | 0.1 | 152  | 0.1 | 703             | 0.5 | 2280             | ?   |
| b                          | Develop model       | 0   | .3  | 100  | .3  | 100  | .3  | 70   | 0.3 | 0    | 0.3 | 270             | 1.5 |                  |     |
|                            | <b>Total</b>        | 130   | .4  | 235  | .4  | 240  | .4  | 216  | 0.4 | 152  | 0.4 | 973             | 2.0 | 2280             |     |

## **Recommendation 2: Existing FAS Ground Water Model**

### **Discussion**

The *LEC Interim Plan* determined that the use of alternative water supply sources of Aquifer Storage and Recovery (ASR), reverse osmosis, and Floridan aquifer blending depends on the development of a Floridan Aquifer System (FAS) model. Since then a preliminary model has been developed. However, the interim recommendation to construct a test well in the C-51 West region was not funded. A need for data collection and advanced model development continues in order to identify appropriate CUP rulemaking and CUP application analysis for the FAS.

This recommendation is to refine the existing FAS ground water flow model using data collected from the construction of ASR projects associated with the CERP, as well as individual utilities with deep well injection facilities. This data would be used to reduce data gaps, support the development and calibration of the proposed model, and evaluate competing uses of the FAS as a water supply source. Following model refinement in 2004, this project is expected to conclude with rulemaking in 2005.

### **Subtasks**

Task 2a. Review and document existing FAS data and identify data gaps

Task 2b. Collect additional data

Task 2c. Refine the existing LEC FAS ground water flow model with new data collected through cooperative agreements, CUP process, and other available sources or develop a density-dependent model.

Task 2d. Develop rules

Cost: \$555,000 over five years

FTEs: 8.5

Funding Source: CERP (data collection from regional ASR facilities), SFWMD, water users, and utilities

Implementing Agency: SFWMD

**Table 73.** Estimated Schedule and Costs for Refining the Floridan Aquifer System Model.

| Recommendation<br>Subtasks |                               | Plan Implementation Costs (\$1,000s and FTEs) |     |      |     |      |     |      |     |      |     |       |     |
|----------------------------|-------------------------------|---|-----|------|-----|------|-----|------|-----|------|-----|-------|-----|
|                            |                               | FY01  |     | FY02 |     | FY03 |     | FY04 |     | FY05 |     | Total |     |
|                            |                               | \$  | FTE | \$   | FTE | \$   | FTE | \$   | FTE | \$   | FTE | \$    | FTE |
| a                          | Data review and documentation |   | 0.5 |      |     |      |     |      |     |      |     |       | 0.5 |
| b                          | Collect additional data       | 125   | 1.6 | 75   | 0.8 | 10   | 0.2 | 10   | 0.2 | 10   | 0.2 | 230   | 3.0 |
| c                          | Refine FAS model              |   |     |      |     | 200  | 2.0 | 75   | 1.0 | 50   | 0.5 | 225   | 3.5 |
| d                          | Rule development              |   |     |      |     |      |     |      |     |      | 1.5 |       | 1.5 |
|                            | <b>TOTAL</b>                  | 125   | 2.1 | 75   | 0.8 | 210  | 2.2 | 85   | 1.2 | 10   | 1.7 | 555   | 8.5 |

### **Recommendation 3: Northern Palm Beach County Comprehensive Water Management Plan**

#### **Discussion**

Since 1995, the city of West Palm Beach and the District have cofunded a cooperative planning effort to develop a Comprehensive Water Management Plan for much of Northern Palm Beach County. The plan focuses primarily on land areas located within the Southern L-8 Basin, the city of West Palm Beach Water Catchment Area/water supply lake system, Loxahatchee Slough, and associated tributary areas (known collectively as the C-18 Basin). The theme of the plan is consistent with the *LEC Regional Water Supply Plan* and the CERP, but it also addresses concerns specific to the subregion.

The planning effort includes two phases. During Phase I, completed in 1997, a computer model was developed capable of evaluating the hydrologic, hydraulic, and water quality effects of conceptual water management options for the study area. Phase II water management options have been developed with input from interested and potentially affected stakeholders using the computer model developed in Phase I. The completion of the options analysis is forthcoming once additional modeling runs have been completed.

Since the interim plan document was completed in March of 1998, many planning and implementation efforts are moving forward in Northern Palm Beach County. The following is a list of these efforts: continuation of annual water quality monitoring in the L-8 Basin; a contract for M Canal widening which began in July of 1999; surface and ground water modeling; discussion of private/public funding for the Loxahatchee Slough structure; and a General Reevaluation Report (GRR) for the L-8 Basin. The schedule for the completion of these are in Table 6-3. The schedule for the Palm Beach Aggregate GRR is found in Volume 9 of the Central and Southern Florida Project Comprehensive Review Study (Restudy).

The Northern Palm Beach County Comprehensive Water Management Plan will be completed in 2000. Development of Memorandums of Understanding (MOUs) among the North Palm Beach County partners needs to be completed to aid in solidifying the operations of this Plan. Additional ground water and surface water modeling runs are also needed. Components of the Northern Palm Beach County Comprehensive Water Management Plan will be implemented through the CERP's Project Implementation Reports (PIRs), and the *LEC Regional Water Supply Plan*, with funding from other appropriate federal processes. The PIRs for features in Northern Palm Beach County are scheduled to begin in 2002 and end in 2014.

### **Subtasks**

- Task 3a. Complete the Northern Palm Beach County Comprehensive Water Management Plan.
- Task 3b. Continue the M Canal widening contract and complete the improvements to the Control 2 structure
- Task 3c. Identify private/local funding of the Loxahatchee Slough structure
- Task 3d. Continue annual L-8 water quality monitoring
- Task 3e. Develop MOUs between Northern Palm Beach partners to implement portions of the Northern Palm Beach County Comprehensive Water Management Plan
- Task 3f. Complete construction of Beeline water control structure with local partner

Cost: \$2,91,000 over three years

FTEs: 2.9

**Funding Source:** City of West Palm Beach, Indian Trail Improvement District, Palm Beach County, CERP and other federal sources, and SFWMD

**Implementing Agencies:** City of West Palm Beach, Indian Trail Improvement District, and SFWMD

**Table 74.** Estimated Schedule and Costs for Completing the Northern Palm Beach County Comprehensive Water Management Plan.

| Recommendation Subtasks |   | Plan Implementation Costs (\$1,000s and FTEs) |     |      |     |      |     |      |     |       |     |
|-------------------------|---|---|-----|------|-----|------|-----|------|-----|-------|-----|
|                         |   | FY01  |     | FY02 |     | FY03 |     | FY04 |     | TOTAL |     |
|                         |   | \$  | FTE | \$   | FTE | \$   | FTE | \$   | FTE | \$    | FTE |
|                         | Complete NPBC Comprehensive WM Plan                   |   |     |      |     |      |     |      |     |       |     |
| b                       | Continue M Canal widening contract                    |   | .25 |      |     | 400  | .25 | 400  | .25 | 800   | .75 |
| c                       | Private/Local funding of Loxahatchee Slough structure | 750   | .25 | 375  | .25 | 375  | .25 |      |     | 1500  | .75 |
| d                       | Continue yearly L-8 Water quality monitoring          | 30  | .10 | 30   | .10 | 30   | .10 |      |     | 90    | 0.3 |
| e                       | Develop MOUs between north county partners            | 1   | .20 |      |     |      |     |      |     | 1     | 0.2 |
| f                       | Beeline Structure                                     | 100   | .3  | 50   | .3  | 50   | .3  |      |     | 200   | 0.9 |
|                         | TOTAL   | 881   | 1.1 | 455  | .65 | 855  | .90 | 400  | .25 | 2591  | 2.9 |

#### **Recommendation 4:** Eastern Hillsboro Regional ASR Pilot Project.

##### **Discussion**

The *LEC Interim Plan* recommended a pilot regional ASR project (eastern site) to be located west of U.S. 441 along the Hillsboro Canal. The plan recommended that this be accomplished in cooperation with Palm Beach County.

This project is associated with the development of a new wellfield to serve Palm Beach County's Water Treatment Plan Number 9 which is located nearby. The new wellfield will consist of ten surficial ground water wells to be located along the northern District right-of-way of the Hillsboro Canal. Five wells will be utilized to supply untreated ground water to a proposed five-million gallons per day (MGD) pilot ASR well. The ASR well will be operated to store and recover water that will be delivered to the water treatment plant and to the Hillsboro Canal. The remaining five wells will exclusively serve the water treatment plant and are not associated with the ASR pilot project at this time. If the operational results of this pilot project support the use of the ASR at this location, construction of an additional five- MGD ASR well will be considered.

This project supports the District's mission to manage water and related resources for the benefit of the public. Information relevant to the application of ASR on a regional scale will be collected during the construction, testing, and operation of the pilot facility at the eastern site. Hydrogeologic information about the Upper Floridan Aquifer will be obtained, and the suitability of the aquifer for ASR will be evaluated. Other issues related

to ASR on a regional scale, such as permitting constraints, water quality, and recovery efficiencies will be assessed. This project, along with the Hillsboro Western Site (Site 1) pilot ASR project, initiated in the *LEC Interim Plan* and incorporated into the Restudy/, will provide a wide cross-section of pertinent data to be used in evaluating the viability of large-scale, regional ASR systems as anticipated in the CERP.

### **Subtasks**

Task 4a. Construction of the ASR well

Task 4b. Operational testing and operation permit submittal

Cost: \$1,670,050 (SFWMD share)

FTEs: 1.7

Funding Source: Palm Beach County and SFWMD

Implementing Agency: Palm Beach County

**Table 75.** Estimated Schedule and Costs for Continuing the Implementation of the Palm Beach County Hillsboro Regional ASR Pilot Project.

| Recommendation<br>Subtasks |  | Plan Implementation Costs (\$1,000s and FTEs) |     |      |     |      |     |      |     |      |     |       |     |
|----------------------------|--|---|-----|------|-----|------|-----|------|-----|------|-----|-------|-----|
|                            |  | FY01  |     | FY02 |     | FY03 |     | FY04 |     | FY05 |     | Total |     |
|                            |  | \$  | FTE | \$   | FTE | \$   | FTE | \$   | FTE | \$   | FTE | \$    | FTE |
| a                          | Construction                                       | 1,500   | 1.5 | 170  | 0.1 |      |     |      |     |      |     | 1,670 | 1.6 |
| b                          | Operational testing/<br>Operation permit submittal |   |     |      |     | 0    | 0.1 |      |     |      |     |       | 0.1 |
|                            | TOTAL  | 1,500   | 1.5 | 170  | 0.1 |      | 0.1 |      |     |      |     | 1,670 | 1.7 |

## **Recommendation 5: Hillsboro (Site 1) Reservoir Pilot Project**

### **Discussion**

The *LEC Interim Plan* recommended a small-scale pilot project reservoir be constructed to assess its performance and to obtain information for a proposed full-scale storage reservoir to capture water lost to tide and return flow to the Hillsboro Canal. The proposed Hillsboro reservoir has been incorporated into the CERP. Seepage rates will be measured and the resulting influence on surrounding ground water levels monitored to determine construction and operational criteria for the large-scale reservoir. The information will be used to determine the maximum storage depth, embankment geometry, size, and control level of seepage collection systems. Pilot seepage collection systems will be evaluated as source water for the Hillsboro pilot ASR wells.



### **Subtasks**

Task 5a. Construction

Task 5b. Operation and testing

Cost: \$3,420,000

FTEs: 3.1

Funding Source: SFWMD

Implementing Agencies: SFWMD

**Table 76.** Estimated Schedule and Costs for the Hillsboro (Site 1) Reservoir Pilot Project.

| Recommendation<br>Subtasks |                       | Plan Implementation Costs (\$1,000s and FTEs) |     |      |     |      |     |      |     |      |     |       |     |
|----------------------------|-----------------------|---|-----|------|-----|------|-----|------|-----|------|-----|-------|-----|
|                            |                       | FY01  |     | FY02 |     | FY03 |     | FY04 |     | FY05 |     | Total |     |
|                            |                       | \$  | FTE | \$   | FTE | \$   | FTE | \$   | FTE | \$   | FTE | \$    | FTE |
| a                          | Construction          | 2,220   | 1.1 | 600  | 0.5 |      |     |      |     |      |     | 2,820 | 1.6 |
| b                          | Operation and testing |   |     | 200  | 0.5 | 300  | 0.5 | 100  | 0.5 |      |     | 600   | 1.5 |
|                            | Total                 | 2,220   | 1.1 | 800  | 1.0 | 300  | 0.5 | 100  | 0.5 |      |     | 3,420 | 3.1 |

## **Recommendation 6: Lake Worth Lagoon Minimum/Maximum Flow Targets**

### **Discussion**

The LEC Interim Plan recommended hydrologic and ecologic studies be conducted to identify the appropriate freshwater flows to the Lake Worth Lagoon. These primarily contractual studies would be managed by District staff in cooperation with Palm Beach County. The studies will include research and modeling to determine how to better manage freshwater flows, improve water quality, and reestablish seagrass communities. District staff are in the process of obtaining additional hydrodynamic/salinity data to complete the development of the model for Lake Worth Lagoon by February 2001. Basin boundaries for the model are being expanded to include the Lake Worth Creek/Intracoastal Waterway segment and south of Boynton Inlet to the bridge structure at Ocean Ridge/Boynton Beach. The model is also being modified to recognize the location of the C-51 divide structure west of U.S. 441. The model will be used to analyze existing and future variable controlled freshwater flows from canal discharge, rainfall, runoff, ground water inflow, and tides. A major goal of these efforts is to manage freshwater flows to the lagoon in a manner that will improve water quality, reduce the transport and deposition of suspended solids in the lagoon, and provide for the reestablishment and sustainability of this ecosystem. With the completion of the model development phase, District staff will need to run simulations, verify the results of the modeling efforts with current conditions within the biological communities of the lagoon, and monitor the performance of the

recommended target flows and the effectiveness of implemented Lake Worth Lagoon Partnership Grant projects.

Additional studies will be considered after FY 2001 to better define relationships among canal discharges, local drainage, and storm water discharges, water quality, sediment deposition and distribution, and the distribution and composition of important biological communities in the lagoon. These studies will provide the background data and understanding needed to support the implementation of CERP Lake Worth Lagoon sediment removal efforts that are scheduled to begin in 2005.

### **Subtasks**

Task 6a. Complete model simulations

Task 6b. Complete aerial photography of seagrasses in Lake Worth Lagoon

Task 6c. Digitize mapping of seagrasses based on aerial photography

Task 6d. Establish/monitor fixed transects to verify aerial photography signatures and monitor the impacts of controlled and noncontrolled releases and the implementation of storm water improvement projects affecting Lake Worth Lagoon

Task 6.e: Publish the recommended flow targets in a peer reviewed, scientific journal.

Cost (FY 2000-2001): \$100,000 (SFWMD)

FTE (FY 2000-2001): 1 (SFMWD)

Funding Source: Palm Beach County and SFWMD

Implementing Agencies: SFWMD and Palm Beach County Department of Environmental Resources Management (DERM)

**Table 77.** Estimated Schedule and Cost for Developing the Lake Worth Lagoon Minimum and Maximum Flow Targets.

| Recommendation<br>Subtasks | Plan Implementation Costs (\$1,000s and FTEs) |     |      |     |      |     |      |     |      |     |       |     |
|----------------------------|---|-----|------|-----|------|-----|------|-----|------|-----|-------|-----|
|                            | FY01  |     | FY02 |     | FY03 |     | FY04 |     | FY05 |     | Total |     |
|                            | \$  | FTE | \$   | FTE | \$   | FTE | \$   | FTE | \$   | FTE | \$    | FTE |
| TOTAL                      | 50  | 0.5 | 50   | 0.5 |      |     |      |     |      |     | 100   | 1.0 |

## **Recommendation 7: Broward Secondary Canals Recharge Network**

### **Discussion**

The *LEC Interim Plan* recommended the development of a master plan to complete the interconnection of surface water infrastructure to allow conveyance of water to maintain/enhance subregional ground water levels, benefit wellfields, selected wetlands, and to prevent saltwater intrusion. The ultimate purpose of this project is to control coastal secondary canals at optimal seasonal levels for maintaining and improving ground water recharge and storage. The source of supply for the secondary canal recharge network is from regional surface water sources including above ground reservoirs in the vicinity of the Hillsboro Impoundment, Lake Okeechobee and Water Conservation Areas (WCAs), /or ASR return flows into the Hillsboro Canal. The project includes construction of canal interconnections, conveyance improvements, pump stations, and monitoring stations.

A surface water model has been completed. The S-46 pump station is scheduled for completion in July 2000. The S-1 pump station is expected to be operational in September 2001. The District has shared the cost of these improvements with Broward County and the city of Fort Lauderdale. The county and the District will develop a master plan for the interconnection of secondary canals from the Hillsboro Canal Basin to the North New River Canal Basin that will work in conjunction with and enhance the functionality of proposed CERP components. The master plan should be developed in phases and used to incrementally schedule the necessary capital improvements.

### **Subtasks**

Task 7a. Develop a master plan

Task 7b. Implement the master plan

Task 7c. Design and build the C-12/13 interconnect

Estimated costs: \$1,900,000 for the initial phase

FTEs: 0.4

Funding source: Broward County, Fort Lauderdale, and SFWMD

Implementing Agency: Broward County, Fort Lauderdale, SFWMD, and other local governments

**Table 78.** Estimated Schedule and Costs for the North Broward County Secondary Canals Recharge Network.

| Recommendation Subtasks |                                       | Plan Implementation Costs (\$1,000s and FTEs) |     |      |     |      |     |      |     |      |     |       |     |
|-------------------------|---------------------------------------|---|-----|------|-----|------|-----|------|-----|------|-----|-------|-----|
|                         |                                       | FY01  |     | FY02 |     | FY03 |     | FY04 |     | FY05 |     | Total |     |
|                         |                                       | \$  | FTE | \$   | FTE | \$   | FTE | \$   | FTE | \$   | FTE | \$    | FTE |
| a                       | Develop Master Plan                   | 150   | 0.1 |      |     |      |     |      |     |      |     | 150   | 150 |
| b                       | Implement Master Plan                 |   |     | 550  | 0.1 | 600  | 0.1 | 600  | 0.1 |      |     | 1750  |     |
|                         | Design and build C-12/13 interconnect |   |     |      |     |      |     |      |     |      |     |       |     |
|                         | TOTAL                                 | 150   | 0.1 | 550  | 0.1 | 600  | 0.1 | 600  | 0.1 |      |     | 1900  | 150 |

### **Recommendation 8: Southeast Broward County Interconnected Water Supply System**

#### **Discussion**

An interagency agreement for the development of an integrated water supply system between the service areas of Hollywood, Hallandale Beach, Dania Beach, Broward County, and possibly the Seminole Tribe and other communities will be developed through a mediated process. The agreement will result in a design study identifying the locations and costs of regional wellfield expansion and water treatment facilities. The District is proposing to be a funding partner in the planning, design, and construction of these facilities.

The analysis of the *LEC Regional Water Supply Plan* focused on water supply solutions involving existing infrastructure. The results of this analysis clearly indicate that a combination of existing facilities or expanded facilities can meet 1-in-10 year water supply needs of the southeast Broward area. Other water supply options, including Floridan systems, reuse, ASR, and other facilities could also be useful. The selection of a preferred solution for this subregion should be made by the southeast Broward interests. This mediated process is an outgrowth from, and in support of, the District's Consumptive Use permitting effort.

Cost: \$400,000 over the next three fiscal years

FTEs: 1.1

Funding Source: The cities of Hallandale Beach, Hollywood, and Dania Beach, Broward County, the SFWMD, and the Seminole Tribe

Implementing Agencies: The cities of Hallandale Beach, Hollywood, and Dania Beach, Broward County, the SFWMD, and the Seminole Tribe

**Table 79.** Estimated Schedule and Costs for the Southeast Broward County Interconnected Water Supply System.

|              | Plan Implementation Costs (\$1,000s and FTEs) |     |      |     |      |     |      |     |      |     |       |     |
|--------------|---|-----|------|-----|------|-----|------|-----|------|-----|-------|-----|
|              | FY01  |     | FY02 |     | FY03 |     | FY04 |     | FY05 |     | Total |     |
|              | \$  | FTE | \$   | FTE | \$   | FTE | \$   | FTE | \$   | FTE | \$    | FTE |
| <b>TOTAL</b> | 300   | 0.5 | 50   | 0.5 | 50   | 0.1 |      |     |      |     | 400   | 1.1 |

**Recommendation 9: Broward County Urban Environmental Enhancement****Discussion**

The available sources and methods for distributing surface water to benefit specific wetland restoration systems will be examined in the Broward County Integrated Water Resource Plan. Local environmental demands will need to be assessed in terms of quantities and timing of deliveries. Once identified, the county and District are prepared to assess the availability of regional and alternative sources of water to meet this demand. Reservation of water will be addressed by the District, and the District will encourage development of alternative sources, such as the use of reclaimed water.

**Subtasks**

- Task 9a. Work with county staff to identify wetland systems, sources of water supply, and timing of deliveries for augmentation, including use of reclaimed water
- Task 9b. Conduct evaluation of availability of supplemental water from reuse and regional storage for average and 1-in-10 drought conditions
- Task 9c. Identify strategies to meet water demands where structural alternatives are necessary
- Task 9d. Identify volumes and sources of supply to be covered by a reservation of water
- Task 9e. Adopt rules to enact reservation if necessary

Cost: \$200,000 within next three years

FTEs: 0.3

Funding Source: Broward County and SFWMD

Implementing Agencies: Broward County and SFWMD

**Table 80.** Estimated Schedule and Costs for Broward County Urban Environmental Enhancement.

|              | Plan Implementation Costs (\$1,000s and FTEs) |     |      |     |      |     |      |     |      |     |       |     |
|--------------|---|-----|------|-----|------|-----|------|-----|------|-----|-------|-----|
|              | FY01  |     | FY02 |     | FY03 |     | FY04 |     | FY05 |     | Total |     |
|              | \$  | FTE | \$   | FTE | \$   | FTE | \$   | FTE | \$   | FTE | \$    | FTE |
| <b>TOTAL</b> | 100   | 0.1 | 50   | 0.1 | 50   | 0.1 |      |     |      |     | 200   | 0.3 |

### **Recommendation 10:** Utility ASR for Miami-Dade Water and Sewer Department

#### **Discussion**

The LEC Interim Plan recommended the development of local ASR in LEC Service Area 3 and provided funding to Miami-Dade County to begin constructing two five-MGD wells. These will be complete by June 2000. These ASR wells use untreated water from the Biscayne aquifer and return water directly to Miami-Dade Water and Sewer Department (WASD) treatment plants. Miami-Dade WASD proposes to have 35 MGD of ASR capacity available in 2005 and 75,000,000 of ASR capacity in 2020.

Cost: \$7,500,000 over next five years (SFWMD share); \$12,000,000 for the additional 40 MGD (eight additional wells)

FTEs: 0.1 per year

Funding Source: Miami-Dade WASD, SFWMD, and the United States Environmental Protection Agency (USEPA)<sup>1</sup>

Implementing Agency: Miami-Dade WASD

**Table 81.** Estimated Schedule and Costs for Developing the Miami-Dade WASD Utility ASR.<sup>a</sup>

| Recommendation Subtasks | Plan Implementation Costs (\$1,000s and FTEs) |     |       |     |       |     |       |     |       |     |                  |                  |
|-------------------------|---|-----|-------|-----|-------|-----|-------|-----|-------|-----|------------------|------------------|
|                         | FY01  |     | FY02  |     | FY03  |     | FY04  |     | FY05  |     | Total \$ 2001-05 | Total \$ 2006-20 |
|                         | \$  | FTE | \$    | FTE | \$    | FTE | \$    | FTE | \$    | FTE | \$               | \$               |
| <b>TOTAL</b>            | 1,500   | 0.1 | 1,500 | 0.1 | 1,500 | 0.1 | 1,500 | 0.1 | 1,500 | 0.1 | 7,500            | 1,2000           |

a. Only average annual costs are reported. Several years may be combined into a single fiscal year.

1. An additional \$500,000 may be available in FY 2001 from the USEPA.

**Recommendation 11: Biscayne Bay Minimum and Maximum Flow Targets****Discussion**

The freshwater flows that maintain environmentally desirable salinity levels within Biscayne Bay need to be identified as recommended in the *LEC Interim Plan*. The completion of an ecological model and conceptual models will complement the hydrodynamic model developed by the U.S. Army Corps of Engineers Water Experimental Station (USACE-WES) and the ground water model developed by the U.S. Geological Survey (USGS). The completion of these tools will enable scenarios of varying freshwater inflows to be evaluated, resulting in recommendations for a salinity regime.

**Subtasks**

Task 11a. Interagency organizational review of models, scenarios, and standards

Task 11b. Data processing

Task 11c. Conduct secondary review

Task 11d. Publish a final report of recommended Minimum Flows and Levels (MFL) technical criteria

Task 11e. Develop a MFL Recovery Plan or Prevention Strategy for those areas that do not meet the proposed MFL criteria

Task 11f. Conduct rule development and rulemaking

Cost: \$200,000 in 2001

FTEs: 2.2 through FY 2003

Funding Source: Florida Forever Act, Surface Water Improvement Management (SWIM), and CERP

Implementing Agencies: SFWMD, Miami-Dade County DERM and USACE

**Table 82.** Estimated Schedule and Costs for Developing Biscayne Bay Minimum and Maximum Flow Targets.

| Recommendation<br>Subtasks |                          | Plan Implementation Costs (\$1,000s and FTEs) |     |      |     |      |     |      |     |      |     |       |     |
|----------------------------|--------------------------|---|-----|------|-----|------|-----|------|-----|------|-----|-------|-----|
|                            |                          | FY01  |     | FY02 |     | FY03 |     | FY04 |     | FY05 |     | Total |     |
|                            |                          | \$  | FTE | \$   | FTE | \$   | FTE | \$   | FTE | \$   | FTE | \$    | FTE |
| a                          | Interorganization Review |   | 0.1 |      | 0.1 |      |     |      |     |      |     |       | 0.2 |
| b                          | Data Processing          | 200   | 0.5 |      |     |      |     |      |     |      |     | 200   | 0.5 |
| c                          | Secondary review         |   | 0.2 |      | 0.1 |      |     |      |     |      |     |       | 0.3 |
| d                          | Final Report             |   |     |      | 0.5 |      |     |      |     |      |     |       | 0.5 |
| e                          | Recovery Plan            |   |     |      | 0.5 |      |     |      |     |      |     |       | 0.5 |
| f                          | Rulemaking               |   |     |      |     |      | 0.2 |      |     |      |     |       | 0.2 |
| <b>TOTAL</b>               |                          | 200   | 0.8 |      | 1.2 |      | 0.2 |      |     |      |     | 200   | 2.2 |

## Recommendation 12: Tribal Water Rights

The District and the Seminole Tribe of Florida entered into a Water Rights Compact (Compact) in 1987 which was enacted by Pub. L. No. 100-228, 101 Stat. 1556, and Chapter 87-292, Laws of Florida, and codified in Section 285.165, F.A.C. The Compact is both state and federal law. It creates a comprehensive system of regulation applicable to the Seminole Tribe's lands that protects the Seminole Tribe's water rights and development potential and is in harmony with the essential terms and principles of the state system. Since the Compact's execution, implementing agreements and District Orders have been entered in furtherance of the Compact. Nothing in these recommendations is intended to modify the District's or the Seminole Tribe's rights as established in the either the Compact or subsequent implementing agreements and orders.

The demands of the Miccosukee Tribe of Indians assumed in the regional water supply planning process are based on representations of the Tribe as to their water needs for the next 20 years. There has been no attempt in this planning process to determine whether the Tribe has any federal legal right to the requested water quantities. As a result, the findings and the conclusions of the LEC Regional Water Supply Plan are not intended to create or alter any rights to water the Miccosukee Tribe of Indians may currently have or intend to perfect in the future under federal or state law. The Governing Board encourages the Tribe to engage in negotiations with the District and the State of Florida to achieve a mechanism for recognition of Tribal water rights. The District will participate in any processes conducted to achieve this goal.



## Other Federal, State, or District Projects

### Recommendation 13: Critical projects

Other federally cost-shared projects, as a group, include the critical projects in the LEC Planning Area for which the District is the local sponsor. These projects have been part of the without plan conditions in the 2020 base case in the *LEC Regional Water Supply Plan* evaluations. These projects are the West Canal Structure (C-4), Western C-11 Water Treatment, and the Lake Okeechobee Water Retention/Phosphorus Removal projects. Each of these was described in Chapter 5. **Table 83** provides annual estimates of nonfederal funding responsibility for 2001 to 2005 for the West Canal Structure (C-4) and Western C-11 Water Treatment projects. Costs for the Lake Okeechobee Water Retention/Phosphorus Removal Project have been included as part of the much larger Lake Okeechobee Water Quality Treatment Facility project, which is a CERP project (See **Table 88** later in this chapter).

**Table 83.** Local Sponsor Funding of Other Federal Projects by Fiscal Year.

| Critical Project             | Local Sponsor Funding Responsibility by Fiscal Year |           |      |      |      |
|------------------------------|---|-----------|------|------|------|
|                              | 2001  | 2002      | 2003 | 2004 | 2005 |
| West Canal Structure (C-4)   | 130,000   |           |      |      |      |
| Western C-11 Water Treatment | 2,000,000   | 2,115,000 |      |      |      |
| <b>TOTAL</b>                 | 2,130,000   | 2,115,000 |      |      |      |

### Recommendation 14: Well Abandonment Program (recommendation from the CWMP)

The District administered a voluntary well abandonment program that identified abandoned artesian wells, geophysically logged them, and plugged or rehabilitated the wells, as necessary, to prevent deterioration of the Surficial Aquifer System (SAS) through upland leakage or discharge to land surface. This program ended in 1991. The program documentation indicates that there are unplugged wells remaining within the planning area and, if plugged, could contribute an estimated net flow of 50,000 acre-feet per year to the water budget of the Caloosahatchee Basin. In addition, the Florida Geological Survey, Bureau of Oil and Gas, have identified larger oil test wells within the planning area that have not been adequately plugged.

Additional effort should be made to locate and properly the free flowing wells in the Caloosahatchee Basin. The District should work with local and state officials to locate uncontrolled abandoned wells and identify plugging strategies and applicable funding sources for proper plugging of the wells.

### **Discussion**

Coordinate with local and state agencies to identify abandoned, unplugged wells and to identify potential funding sources. This involves staff support and coordination only.

Cost: No direct cost associated with this recommendation.

FTEs: 0.5

Funding Source: Potential sources include landowners, local government, and water resource development funds

Implementing Agency: SFWMD

**Table 84.** Estimated Schedule and Costs for the CWMP Well Abandonment Program.

| Recommendation                                | Plan Implementation Costs (\$1,000s and FTEs) |     |      |     |      |     |      |     |      |     |       |      |
|---|---|-----|------|-----|------|-----|------|-----|------|-----|-------|------|
|   | FY01  |     | FY02 |     | FY03 |     | FY04 |     | FY05 |     | Total |      |
|   | \$  | FTE | \$   | FTE | \$   | FTE | \$   | FTE | \$   | FTE | \$    | FTE  |
| Coordinate identification of unplugged wells. |   | .25 |      | .25 |      |     |      |     |      |     |       | 0.50 |

### **Recommendation 15:** Salt water influence at S-79 (recommendation from the CWMP)

### **Discussion**

Saline water has been a recurring problem for the potable water intakes in the Caloosahatchee River. The potable water intakes are located approximately one mile upstream of S-79. During extended periods of low flow, the chloride content of the shallow water increases well beyond the recommended limit of 250 mg/l for drinking water. In response releases have been made from Lake Okeechobee. A number of alternatives to refine these releases warrant further investigation and include moving the intake farther upstream, modifications to the structure, limiting lockages during low flow periods, improved maintenance and operation of the bubble curtain, and seasonal reductions in river withdrawals. Future freshwater releases for environmental purposes may also minimize saltwater influence. Additional analysis of the front migration should be initiated.

The District will coordinate additional analysis of the saltwater influence problem at S-79. This recommendation involves staff support and coordination only.

Cost: No direct cost associated with this recommendation.

FTEs: 0.5

Funding Source: USACE and local government

Implementing Agency: SFWMD

**Table 85.** Estimated Schedule and Costs for the CWMP Saltwater Influence Analysis.

| Recommendation  | Plan Implementation Costs (\$1,000s and FTEs) |     |      |     |      |     |      |     |      |     |       |     |
|---|---|-----|------|-----|------|-----|------|-----|------|-----|-------|-----|
|   | FY01  |     | FY02 |     | FY03 |     | FY04 |     | FY05 |     | Total |     |
|   | \$  | FTE | \$   | FTE | \$   | FTE | \$   | FTE | \$   | FTE | \$    | FTE |
| Coordinate identification of needed additional analysis |   | .5  |      |     |      |     |      |     |      |     |       | .5  |

## **Recommendation 16: Permitting Issues Associated with ASRs**

### **Discussion**

The District should continue working with the legislature, the EPA, and the FDEP to explore rule changes to the federal and state Underground Injection Control Program to allow for, and encourage, injection of ground water or surface water with ASR. The level of treatment should be compatible with the water quality in the proposed storage zone. Existing rule criteria will be identified and modified to facilitate changes in ASR regulations that will, in turn, facilitate the development of water source options.

Cost: \$0

FTEs: 0.13

Funding Source: SFWMD

Implementing Agency: SFWMD

**Table 86.** Estimated Schedule and Costs for Permitting Issues Associated with ASRs.

| Recommendation  | Plan Implementation Costs (\$1,000s and FTEs) |     |      |     |      |     |      |     |      |     |       |     |
|---|---|-----|------|-----|------|-----|------|-----|------|-----|-------|-----|
|   | FY01  |     | FY02 |     | FY03 |     | FY04 |     | FY05 |     | Total |     |
|   | \$  | FTE | \$   | FTE | \$   | FTE | \$   | FTE | \$   | FTE | \$    | FTE |
| Work with the legislature, FDEP and EPA<br>Est. start date: 10/00<br>Est. finish date: 9/05 |   | .05 |      | .05 |      | .01 |      | .01 |      | .01 |       | .13 |

## Recommendation 17: Mobile Irrigation Labs

### Discussion

The Florida Department of Agriculture and Consumer Services (FDACS) should administer and fund the two existing and one additional Mobile Irrigation Labs (MILs) in the LEC Planning Area. To replace current District participation, additional funding sources need to be found. An additional urban MIL is recommended for Broward County.

### Subtasks

Task 17a. Identify dedicated funding sources to support existing MILs

Task 17b. Maintain existing MILs in the LEC Planning Area

Task 17c. Establish an additional MIL to serve Broward County

Cost: \$1,513,000

FTEs: None by SFWMD

Funding Source: Potential funding sources are FDEP, FDACS, Soil and Water Conservation Districts (SWCD), user fees, and utilities

Implementing Agency: SWCD and FDACS

**Table 87.** Estimated Schedule and Costs for Establishing Mobile Irrigation Labs.

| Recommendation<br>Subtasks |   | Plan Implementation Costs (\$1,000s and FTEs) |      |           |      |           |      |           |      |           |      |       |      |
|----------------------------|---|---|------|-----------|------|-----------|------|-----------|------|-----------|------|-------|------|
|                            |   | FY01  |      | FY02      |      | FY03      |      | FY04      |      | FY05      |      | Total |      |
|                            |   | \$  | FTE  | \$        | FTE  | \$        | FTE  | \$        | FTE  | \$        | FTE  | \$    | FTE  |
| a                          | Identify funding Sources  | 70<br>130                                     | 0.01 | 70<br>130 | 0.01 | 70<br>130 | 0.01 | 70<br>130 | 0.01 | 70<br>130 | 0.01 | 1163  | 0.06 |
| b                          | Maintain MILs <sup>a</sup><br>Est. start date: 10/00<br>Est. finish date: 9/01            |   |      |           |      |           |      |           |      |           |      |       |      |
| c                          | Establish additional MILa<br>Urban<br>Est. start date: 10/01<br>Est. finish date: Ongoing | 70  | 0.01 | 70        | 0.01 | 70        | 0.01 | 70        | 0.01 | 70        | 0.01 | 350   | 0.05 |
| <b>TOTAL</b>               |   | 270   | 0.02 | 270       | 0.02 | 270       | 0.02 | 270       | 0.02 | 270       | 0.02 | 1513  | 0.11 |

a. Costs shown for the MIL's include FTEs to operate.

## Comprehensive Everglades Restoration Plan

### Recommendation 18: CERP projects that affect the LEC Planning Area and the Caloosahatchee Basin

The analysis completed as part of the *LEC Regional Water Supply Plan* confirms that the Restudy projects scheduled for completed by 2020 are extremely beneficial for meeting MFLs and natural system restoration targets, including reducing high water flows to estuaries, and providing water to meet demands in the LEC Planning Area. These projects are being refined and implemented in the Comprehensive Everglades Restoration Plan (CERP). The water resource development projects, operational changes, and environmental restoration projects listed in **Table 88** are CERP projects recommended for completion by 2020. Completion of the CERP projects by 2020, and timely implementation according to the schedule in the Restudy (USACE, 1999) is crucial to meeting the objectives of the *LEC Regional Water Supply Plan*.

The CERP is considered in its entirety as one component of the *LEC Regional Water Supply Plan's* program of water resource development projects. Many of the proposed projects have significant water resource benefits that need to be considered in this plan. No attempt is made to provide a further breakdown of costs at this time as the resolution of state and federal agreements on funding is still pending. **Table 88** provides a list of all CERP projects in the LEC Planning Area with annual estimates of nonfederal funding responsibility for fiscal years 2001 to 2005 and the total cost through FY 2020. **Table 89** provides a similar list of all CERP projects in the Caloosahatchee Basin.

**Table 88.** Nonfederal Funding Responsibility of CERP Projects in the Lower East Coast Planning Area.

| Project  | Cost for Fiscal Year (in 1999 dollars) |            |            |           |           |                    |                    |                    |
|--|--|------------|------------|-----------|-----------|--------------------|--------------------|--------------------|
|  | 2001                                   | 2002       | 2003       | 2004      | 2005      | Total<br>2001-2005 | Total<br>2001-2020 | Total<br>2006-2020 |
| Taylor Creek Nubbin Slough Reservoir and STA (W) | 766,000                                | 10,310,685 | 14,918,910 | 4,920,230 | 79,598    | 30,995,423         | 51,497,923         | 20,502,500         |
| Lake Okeechobee Water Quality Treatment Facility | 0                                      | 494,395    | 546,680    | 7,345,724 | 7,180,656 | 15,567,455         | 31,123,501         | 15,556,046         |
| Lake Okeechobee Tributary Dredging               | 0                                      | 52,334     | 487,942    | 467,726   | 1,342,000 | 2,350,001          | 2,350,001          | 0                  |
| Lake Okeechobee ASR Pilot Project                | 5,066,667                              | 1,532,308  | 401,539    | 293,846   | 0         | 7,294,359          | 7,294,359          | 0                  |
| Lake Okeechobee ASR (GG)                         | 0                                      | 0          | 0          | 1,560,123 | 5,735,099 | 7,295,221          | 548,656,001        | 541,360,780        |
| EAA Storage Phase 1 (G1)                         | 1,603,500                              | 1,606,585  | 1,207,376  | 1,204,286 | 1,413,124 | 7,034,870          | 115,094,333        | 108,059,463        |
| WCA-1 Internal Structures (KK)                   | 187,412                                | 738,350    | 2,807,104  | 0         | 0         | 3,732,866          | 3,732,866          | 0                  |
| Seminole Water Conservation Plans                | 716,750                                | 1,517,397  | 3,166,194  | 2,404,712 | 358,019   | 8,163,071          | 37,644,001         | 29,480,930         |

**Table 88. Nonfederal Funding Responsibility of CERP Projects in the Lower East Coast Planning Area.(Continued)**

| Project   | Cost for Fiscal Year (in 1999 dollars) |            |            |           |            |                    |                    |                    |
|---|--|------------|------------|-----------|------------|--------------------|--------------------|--------------------|
|   | 2001                                   | 2002       | 2003       | 2004      | 2005       | Total<br>2001-2005 | Total<br>2001-2020 | Total<br>2006-2020 |
| Miccosukee Water Management Plan                            | 312,334                                | 1,841,522  | 117,701    | 88,111    | 1,238,693  | 3,598,360          | 12,151,418         | 8,553,058          |
| G-404 Pump Station Modifications (II)                       | 0                                      | 0          | 0          | 140,405   | 95,323     | 235,728            | 5,069,000          | 4,833,272          |
| Flows to NW and Central WCA-3A (RR)                         | 259,789                                | 212,054    | 107,161    | 92,309    | 1,080,727  | 1,752,039          | 10,369,500         | 8,617,462          |
| PIR SS, AA, QQ Phase 1, Decompart-mentalization Compo-nents | 1,300,500                              | 425,164    | 0          | 0         | 0          | 1,725,664          | 1,725,664          | 0                  |
| Reroute Miami Canal (SS)                                    | 0                                      | 8,692,877  | 12,891,141 | 4,220,652 | 54,831     | 25,859,501         | 37,486,501         | 11,627,000         |
| Additional S-345 Structures (AA)                            | 0                                      | 112,708    | 167,141    | 167,781   | 167,141    | 614,770            | 23,226,501         | 22,611,731         |
| Decompartmentaliza-tion of WCA-3A Phase 1 (QQ1)             | 0                                      | 250,301    | 371,184    | 180,690   | 1,507,295  | 2,309,470          | 12,927,501         | 10,618,031         |
| PIR K, GGG, LL, VV  | 0                                      | 3,947,458  | 3,947,458  | 3,902,085 | 0          | 11,797,000         | 11,797,000         | 0                  |
| L-8 Basin Modifications (K)                                 | 0                                      | 0          | 0          | 37,718    | 2,461,054  | 2,498,772          | 35,658,000         | 33,159,228         |
| C-51 and Southern L-8 Reservoir (GGG)                       | 0                                      | 0          | 0          | 153,330   | 10,004,740 | 10,158,070         | 164,028,001        | 153,869,931        |
| Pal-Mar Corbett Hydropattern Restoration                    | 0                                      | 3,953,899  | 3,923,666  | 8,435     | 0          | 7,886,000          | 5,250,000          | -2,636,000         |
| C-17 Backpumping and Treatment (X)                          | 0                                      | 0          | 3,209,550  | 3,548,110 | 3,425,414  | 10,183,074         | 10,095,002         | -88,073            |
| C-51 Backpumping and Treatment (Y)                          | 0                                      | 0          | 4,262,012  | 4,711,592 | 4,481,069  | 13,454,673         | 16,316,001         | 2,861,327          |
| Reuse Technology Pilot Project                              | 514,520                                | 410,158    | 2,793,843  | 4,578,736 | 5,691,534  | 13,988,790         | 14,483,021         | 494,231            |
| C-51 Regional Ground Water ASR (LL)                         | 0                                      | 0          | 0          | 81,054    | 5,288,784  | 5,369,838          | 63,645,500         | 58,275,662         |
| Acme Basin B (OPE)  | 0                                      | 4,339,627  | 4,306,681  | 39,693    | 0          | 8,686,000          | 10,050,000         | 1,364,000          |
| Protect Wetlands next to WCA-1                              | 35,810,775                             | 0          | 5,494,036  | 6,073,576 | 498,813    | 47,877,201         | 26,386,001         | -21,491,200        |
| Agricultural Reserve Reservoir (VV)                         | 0                                      | 0          | 0          | 0         | 1,604,874  | 1,604,874          | 60,679,500         | 59,074,626         |
| Winsburg Farms Wetlands                                     | 792,917                                | 2,770,281  | 705,443    | 8,360     | 2,152,712  | 6,429,712          | 6,967,001          | 537,289            |
| Site 1 ASR Pilot Project                                    | 1,595,193                              | 2,255,962  | 198,847    | 0         | 0          | 4,050,001          | 4,050,001          | 0                  |
| Site 1 Impoundment Phase 1 (M1)                             | 14,948,261                             | 4,271,899  | 4,239,560  | 51,104    | 0          | 23,510,825         | 19,267,500         | -4,243,325         |
| Site 1 ASR (M2)   | 0                                      | 0          | 637,773    | 705,049   | 702,358    | 2,045,179          | 46,422,000         | 44,376,821         |
| C-11 Impoundment and Canal (Q)                              | 0                                      | 41,039,740 | 40,726,379 | 144,381   | 0          | 81,910,501         | 62,418,501         | -19,492,000        |
| C-9 Impoundment (R)   | 0                                      | 31,207,331 | 30,968,887 | 89,308    | 0          | 62,265,526         | 44,573,001         | -17,692,525        |

**Table 88. Nonfederal Funding Responsibility of CERP Projects in the Lower East Coast Planning Area.(Continued)**

| Project  | Cost for Fiscal Year (in 1999 dollars) |            |            |            |            |                    |                    |                    |
|--|--|------------|------------|------------|------------|--------------------|--------------------|--------------------|
|  | 2001                                   | 2002       | 2003       | 2004       | 2005       | Total<br>2001-2005 | Total<br>2001-2020 | Total<br>2006-2020 |
| Broward County<br>Secondary Canals<br>(CC)                       | 37,750                                 | 151,581    | 415,662    | 509,514    | 1,193,509  | 2,308,016          | 6,449,001          | 4,140,985          |
| Levee Seepage<br>Management PIR<br>(V,O,FF)                      | 955,251                                | 1,837      | 0          | 0          | 0          | 957,088            | 957,088            | 0                  |
| WCA-3A and WCA-3B<br>Levee Seepage<br>Management (O)             | 0                                      | 27,797,554 | 27,850,757 | 27,558,039 | 0          | 83,206,350         | 49,853,500         | -33,352,850        |
| Lakebelt Technology<br>Pilot Project                             | 572,650                                | 2,230,770  | 2,230,770  | 2,239,317  | 2,230,770  | 9,504,275          | 10,500,002         | 995,727            |
| Dade Broward Levee/<br>Pennsuco (BB)                             | 0                                      | 4,402,418  | 4,368,948  | 34,235     | 0          | 8,805,600          | 9,389,000          | 583,400            |
| Bird Drive Recharge<br>Area (U)                                  | 0                                      | 0          | 0          | 10,834,465 | 14,427,528 | 25,261,993         | 62,041,501         | 36,779,508         |
| Seepage Management<br>Pilot Project                              | 326,282                                | 4,220,193  | 447,116    | 6,411      | 0          | 5,000,001          | 5,000,001          | 0                  |
| L-31N Levee<br>Improvement (V)                                   | 0                                      | 0          | 217,539    | 237,480    | 236,573    | 691,591            | 32,891,000         | 32,199,409         |
| S-356 Structures (FF)  | 0                                      | 0          | 28,154,278 | 31,124,139 | 30,972,344 | 90,250,762         | 57,373,001         | -32,877,761        |
| C-4 Structure Divide<br>(T)                                      | 64,359                                 | 251,777    | 207,614    | 5,325      | 618,875    | 1,147,950          | 1,147,950          | 0                  |
| Biscayne Bay Coastal<br>Wetlands (FFF)                           | 16,667                                 | 176,749    | 630,918    | 633,335    | 8,477,416  | 9,935,084          | 149,770,540        | 139,835,456        |
| C-111 North Spreader<br>Canal (WW)                               | 3,151,565                              | 15,097,629 | 15,097,629 | 12,352,339 | 134,716    | 45,833,876         | 46,571,027         | 737,150            |
| Florida Keys Tidal<br>Restoration                                | 18,268                                 | 41,643     | 21,391     | 281,075    | 253,700    | 616,077            | 616,077            | 0                  |
| Florida Bay Feasibility<br>Study                                 | 461,539                                | 501,923    | 501,923    | 503,846    | 30,770     | 2,000,000          | 2,000,000          | 0                  |
| RECOVER  | 4,985,060                              | 5,004,233  | 5,004,233  | 5,023,407  | 5,004,233  | 25,021,166         | 100,046,316        | 75,025,151         |
| Comprehensive<br>Ecosystem Water<br>Quality Improvement<br>Study | 639,607                                | 642,067    | 642,067    | 644,527    | 642,067    | 3,210,333          | 3,997,541          | 787,208            |
| Pineland Hardwood<br>Restoration                                 | 8,334                                  | 7,190      | 3,993      | 73,010     | 140,288    | 232,813            | 300,000            | 67,188             |
| South Miami-Dade<br>Reuse (BBB)                                  |  |            |            |            |            | 0                  | 181,512,002        | 181,512,002        |
| Big Cypress/L-28<br>Interceptor (CCC)                            |  |            |            |            |            | 0                  | 21,375,501         | 21,375,501         |
| West Miami-Dade<br>Reuse (HHH)                                   |  |            |            |            |            | 0                  | 218,618,501        | 218,618,501        |
| EAA Storage Phase 1<br>(G2)                                      |  |            |            |            |            | 0                  | 101,620,001        | 101,620,001        |
| North of Lake Storage<br>(A)                                     |  |            |            |            |            | 0                  | 142,427,001        | 142,427,001        |
| PIR S,EEE,ZZ,YY,XX   |  |            |            |            |            | 0                  | 17,521,500         | 17,521,500         |

**Table 88.** Nonfederal Funding Responsibility of CERP Projects in the Lower East Coast Planning Area.(Continued)

| Project   | Cost for Fiscal Year (in 1999 dollars) |               |             |             |             |                    |                    |                    |
|---|--|---------------|-------------|-------------|-------------|--------------------|--------------------|--------------------|
|   | 2001                                   | 2002          | 2003        | 2004        | 2005        | Total<br>2001-2005 | Total<br>2001-2020 | Total<br>2006-2020 |
| Central Lakebelt<br>Storage Area Phase 1<br>(S1)                |  |               |             |             |             | 0                  | 163,570,773        | 163,570,773        |
| Flows from Central<br>Lake Belt to WCA-3B<br>(EEE)              |  |               |             |             |             | 0                  | 3,272,000          | 3,272,000          |
| Flows from WCA-3A<br>and WCA-3B to<br>Central Lake Belt (ZZ)    |  |               |             |             |             | 0                  | 382,501            | 382,501            |
| Divert Flows from<br>WCA-2 to Central<br>Lake Belt (YY)         |  |               |             |             |             | 0                  | 38,078,001         | 38,078,001         |
| North Lake Belt<br>Storage Area Phase 1<br>(XX1)                |  |               |             |             |             | 0                  | 118,837,387        | 118,837,387        |
| Decompartmentaliza-<br>tion of WCA-3A Phase<br>2 (QQ2)          |  |               |             |             |             | 0                  | 29,602,000         | 29,602,000         |
| Lake Worth Lagoon<br>Restoration                                |  |               |             |             |             | 0                  | 1,150,000          | 1,150,000          |
| Melaleuca and other<br>Exotic Plant OPE                         |  |               |             |             |             | 0                  | 2,886,001          | 2,886,001          |
| <b>Total for CERP<br/>Projects in the LEC<br/>Planning Area</b> | 75,111,944                             | 1,825,105,945 | 228,399,042 | 139,279,580 | 120,926,642 | 746,227,802        | 3,082,191,801      | 2,335,963,999      |

**Table 89.** Nonfederal Funding Responsibility of CERP Projects in the Caloosahatchee Water Management Planning Area.

| Project   | Cost for Fiscal Year (in 1999 dollars) |           |            |            |            |                     |                    |
|---|--|-----------|------------|------------|------------|---------------------|--------------------|
|   | 2001                                   | 2002      | 2003       | 2004       | 2005       | Total 2001-<br>2005 | Total<br>2001-2020 |
| Caloosahatchee<br>River ASR Pilot<br>Project            | 250,000                                | 2,298,077 | 278,846    | 83,975     | 83,654     | 2,994,552           | 3,000,000          |
| C-43 Storage and<br>ASR (D)                             | 2,154,334                              | 2,162,620 | 23,925,026 | 66,386,023 | 43,465,970 | 138,093,972         | 219,376,628        |
| Caloosahatchee STA<br>and Backpumping<br>(DDD)          |  |           |            |            |            |                     | 41,447,501         |
| Southwest Feasibility<br>Study                          | 1,000,000                              | 1,800,000 | 1,800,000  | 1,000,000  | 500,000    | 6,100,000           | 0                  |
| <b>Total for CERP<br/>Projects in the<br/>CWMP Area</b> | 3,404,334                              | 6,260,697 | 26,003,872 | 67,469,997 | 44,049,624 | 147,188,524         | 263,824,129        |



## Recommendations to the CERP from the LEC Regional Water Supply Plan

*LEC Regional Water Supply Plan* analysis indicates refinement of some of the CERP projects may improve their performance. These suggestions for further refinement are discussed below. The *LEC Regional Water Supply Plan* recommends that CERP consider these modifications in the planning and design of CERP projects during the Project Implementation Reporting (PIR) and RECOVER process and in any operational changes for these features.

### **Recommendation 19: S-155A**

The *LEC Regional Water Supply Plan* recommends that additional analysis in the design phase of CERP determine the most effective method to provide water to the C-51 Backpumping component while continuing to provide benefits to the Lake Worth Lagoon without affecting the location of S-155A as designed for the Everglades Construction Project.

### **Recommendation 20: Everglades hydropatterns within WCA-2B**

Results of regional modeling efforts performed as part of the *LEC Regional Water Supply Plan* identified WCA-2B as the only area of the northern Everglades that received a red score for all the incremental alternatives (2005-2020), as well as for LEC-1. These results indicate this area of the Everglades fails to meet LEC regional water supply planning targets and ecosystem recovery is not likely to occur unless significant hydrologic improvements are made to the area. These results are similar to the modeling results recorded in Appendix D of the Restudy (USACE, 1999).

The reason for this ranking is WCA-2B continues to have high frequencies of both high and low water extremes as compared to Natural System Model targets. These high water periods would be detrimental to remaining tree islands and sawgrass communities, while the low water extremes would tend to cause increased soil subsidence and encourage the expansion of melaleuca communities within WCA-2B.

It is the intent of the LEC regional water supply planning process to implement the recommendations of the CERP's RECOVER teams to restore or improve Everglades hydropatterns within WCA-2B. The RECOVER teams of CERP will have the lead responsibility for identifying potential improvements in design or operations that will resolve any remaining performance problems currently predicted for both the CERP and the *LEC Regional Water Supply Plan* for this area of the Everglades Basin.

The approach which will be used by the CERP RECOVER teams to improve WCA-2B will be to review and refine (where necessary) the performance measures and indicator regions used to evaluate hydrological performance. An increase in the number of indicator cells in WCA-2B may be required to better understand the nature of the hydrological performance problem and potential solutions. Once performance measures

are reviewed, additional structural improvements and operational features will be suggested and modeled to determine potential solutions to WCA-2B performance. Once these improvements have been identified, they will be presented to the LEC Water Supply Plan Advisory Committee and District Governing Board for review and approval and implemented as part of the 2005 *LEC Regional Water Supply Plan*.

### **Recommendation 21: Everglades Agricultural Area Storage Reservoirs**

This feature as designed in the Restudy includes above ground reservoir(s) with a total storage capacity of approximately 360,000 acre-feet located in the Everglades Agricultural Area (EAA) in western Palm Beach County and conveyance capacity increases for the Miami, North New River, Bolles, and Cross canals. The initial design for the reservoir(s) assumed 60,000 acres, divided into three, equally sized compartments (1, 2, and 3), with the water level fluctuating up to six feet above grade in each compartment. The final size, depth and configuration of this facility will be determined through more detailed planning and design.

The purpose of this CERP feature is to improve the timing of environmental deliveries to the WCAs, including reducing damaging flood releases from the EAA to the WCAs, reducing Lake Okeechobee regulatory releases to the estuaries, meeting EAA irrigation and Everglades water demands, and increasing flood protection in the EAA.

Runoff from the EAA, the Miami Canal Basin, and the North New River Canal Basin and regulatory releases from Lake Okeechobee will be pumped into the reservoirs. Compartment 1 discharges will be used to meet EAA irrigation demands. Compartment 2 discharges will be used to meet environmental demands as a priority and can be used to supply a portion of agricultural demands if the environmental demands equal zero. Compartment 3 discharges will be used to meet environmental demands.

The *LEC Regional Water Supply Plan* recommends four changes to this feature. First, the sizes of the reservoirs would be modified. This change would enable more water supply demands in the EAA to be met. Compartment 1 could be increased to 180,000 acre-feet to meet EAA irrigation demands; Compartment 2A would remain the same size, 120,000 acre-feet, and Compartment 2B would be decreased to 60,000 acre-feet. Second, the runoff from the portion of the Hillsboro Canal Basin within the EAA could be captured and routed to the enlarged Compartment 1. Third, Compartment 1 could be used to meet demands in the West Palm Beach Canal Basin as well as the other EAA basins. By implementing these changes, a greater percentage of future EAA demands can be met. Fourth, structural and conveyance changes may be necessary to implement these modifications. Excess water available in required ASR facilities in LEC Service Area 1 (LECSA 1) will be diverted, when possible, to the EAA to partially meet its demands.

### **Recommendation 22: L-8 Basin Project**

This Restudy component was designed to include a combination above ground and in-ground reservoir with a total storage capacity of approximately 48,000 acre-feet located immediately west of the L-8 Borrow Canal and north of the C-51 Canal in Palm Beach

County. Other construction features include ASR wells with a capacity of 50 MGD, a series of pumps, water control structures, and canal capacity improvements in the M Canal. The initial design assumed a 1,800-acre reservoir with 1,200 usable acres with the water level fluctuating from 10 feet above grade to 30 feet below grade. The initial design assumed 50 wells, each with a capacity of five MGD with chlorination for pretreatment and aeration for posttreatment.

The purpose of this feature is to increase water supply availability and flood protection for northern Palm Beach County areas. It will also provide flows to enhance hydroperiods in the Loxahatchee Slough, increase base flows to the Northwest Fork of the Loxahatchee River, and reduce high discharges to the Lake Worth Lagoon.

In the Restudy it was assumed water will be pumped into the reservoir from the C-51 Canal and Southern L-8 Borrow Canal during the wet season, or periods when excess water is available, and returned to the C-51 and Southern L-8 during dry periods. Additional features will also direct excess water into the West Palm Beach Water Catchment Area. During periods when the West Palm Beach Water Catchment Area is above desirable stages, 50 MGD will be diverted to Lake Mangonia for storage in the ASR wells. The reservoir portion of this component may be implemented under a previous authorization.

Modeling completed by the *LEC Regional Water Supply Plan*, utilized stored ASR water more often and redirected where it is distributed. Consequently, the operation of the ASR portion of this feature was optimized. Water stored in excess of a selected threshold could be conveyed to the EAA to meet irrigation demands. Utilizing this water could prevent the volume of water stored from accumulating in excessive volumes, optimize its beneficial use and reduces demands on the Lake Okeechobee. The *LEC Regional Water Supply Plan* recommends development of an operating schedule that can optimize the use of the stored ASR water to meet EAA demands.

### **Recommendation 23: C-51 Regional Ground Water Projects ASR facilities**

The purpose of this feature is to capture and store excess flows from the C-51 Canal, currently discharged to the Lake Worth Lagoon, for later use during dry periods. This feature was designed to include a series of ASR wells with a capacity of 170 MGD, as well associated pretreatment and posttreatment for water quality, to be constructed along the C-51 Canal in Palm Beach County. The initial design of the wells assumed 34 well clusters, each with a capacity of five MGD with chlorination for pretreatment and aeration for posttreatment.

The LEC analysis modified the operation of the ASR facilities to try to optimize its operation. Utilizing stored ASR water more often and redirecting where it is distributed could optimize the operation of the ASR portion of this feature. Water stored in excess of the water requirements to maintain the C-51 Canal and Lake Worth Drainage District could be conveyed to the EAA to meet irrigation demands. Utilizing this water prevents the volume of water stored from accumulating in excessive volumes and optimizes its beneficial use.

**Recommendation 24: West Miami-Dade Reuse Feasibility Study**

This feature was designed to produce superior, advanced treatment of wastewater from a future West Miami-Dade Wastewater Treatment Plant. The plant will be located in the Bird Drive Basin in Miami-Dade County. The initial design assumed a potential discharge volume of 100 MGD from the wastewater treatment plant. The final configuration of these facilities will be determined through more detailed planning and design to be completed in the ongoing West Miami-Dade Water Reuse Feasibility Study authorized in Section 413 of the Water Resources Development Act of 1996. Superior water quality treatment features would be based on appropriate pollution load reduction targets necessary to protect downstream receiving surface waters.

The purpose for the feature is to meet the demands for the Bird Drive Recharge Area, the South Dade Conveyance System, and the Northeast Shark River Slough. When all demands have been met, the plant would stop treatment beyond secondary treatment standards and will dispose of the secondary treated effluent into deep injection wells.

In the Restudy, it was recognized that further study would look at other options and consider cost-effectiveness alternatives. The LEC regional water supply planning process began this process using models. In the models, the quantity of reuse being produced was assumed to be only 50 MGD in 2020. The *LEC Regional Water Supply Plan* recommends that, as part of the West Miami-Dade Reuse Feasibility Study, the volume of reuse water needed to meet identified demands should be re-evaluated, that other beneficial uses of reclaimed water should also be considered, and that alternative sources of water should be analyzed.

**Recommendation 25: Lake Okeechobee regulation schedule**

Modifications to the Lake Okeechobee regulation schedule, run 25, were recommended in the Restudy. These modifications would take advantage of the additional storage facilities identified in the construction features. Two additional zones will be added to the schedule. The first zone will trigger discharges to the north of the Lake Okeechobee Reservoir and the EAA Reservoir. The second higher zone will trigger the Lake Okeechobee ASR facilities to begin injecting water from the lake. Climate based forecasting will be used to guide management decisions regarding releases to the storage facilities.

As part of the *LEC Regional Water Supply Plan* analysis, a Water Supply and Environmental (WSE) schedule with modifications to accommodate additional storage features, showed superior performance in meeting environmental and water supply demands on the lake. The WSE schedule was recommended by the *LEC Interim Plan* and continues to perform better than the modified Run 25 schedule used in the Restudy. The WSE schedule is able to meet a greater percentage of water supply demands in the LEC and the Lake Okeechobee Service Area (LOSA), while providing environmental deliveries to the estuaries and the Everglades. Increased storage and demands on the lake alters operation of it. The schedule should be updated as major new storage features are constructed or at least every five years over the next 20 years.

## **Recommendation 26: Lake Belt Storage Project**

The Lake Belt reservoirs are expected to be complete in 2036 (beyond the 2020 time frame used in the LEC regional water supply planning process) Modeling and analysis for the *LEC Regional Water Supply Plan* has shown that completing 50 percent of the planned reservoir capacity is critical in meeting the multiple water resource objectives in the region by 2020. The construction of seepage barriers, which are necessary for this design, will require careful coordination with the limestone mining industry in order to obtain a portion of reservoir capacity before mining is complete. Likewise, pilot studies to test the feasibility of some aspects of the concept are critical and will require ongoing coordination with the mining industry. The *LEC Regional Water Supply Plan* recommends the identification of seepage barrier locations early on and coordination with the industry on the timing of mining such that blasting will not cause damage to seepage barriers.

## **Recommendation 27: Everglades Rain Driven Operations**

Modifications to the regulation schedules for WCAs 2A, 2B, 3A, 3B, and the current Rainfall Delivery Formula for Everglades National Park were recommended in the Restudy to implement rain driven operations for all of these areas. These new operational rules are intended to improve timing and range of water depths in the WCAs and Everglades National Park to restore more natural hydropatterns, as well as meet MFLs for these areas.

The rain-driven operational concept is a basic shift from the current operational practice, which uses calendar based regulation schedules for the WCAs. Regulation schedules, also referred to as rule curves, or flood control schedules, typically specify the release rules for a WCA based on the water level at one or more key gages. Regulation schedules do not typically contain rules for importing water from an upstream source. The regulation schedules also repeat every year and make no allowance for interannual variability. The rain-driven operational concept includes rules for importing and exporting water from the WCAs in order to mimic a desired target stage hydrograph at key locations within the Everglades system. The target stage hydrographs mimic an estimate of the more natural (predrainage Everglades) water level response to rainfall.

Analysis of incremental runs performed as part of the LEC regional water supply planning process indicate that rain driven operations for WCAs 2B, 3A, 3B, and Everglades National Park could be developed and implemented by 2005. The rain driven operations for WCA 2A should be developed and implemented by 2010. The rain driven operations are key to providing additional water when needed prior to construction of the major storage features recommended in the Restudy. The schedules are to be updated as major storage features are constructed or at least every five years. Additionally, a methodology to transform concepts applied during regional model simulations to rainfall formulas that can be applied during daily operation of the C&SF Project should be developed by 2003. WCA-1 is recommended to retain its latest regulation schedule until comprehensive analysis be undertaken to determine whether a future rainfall driven schedule will be beneficial.

### **Recommendation 28: Change Coastal Wellfield Operations**

Shifting demands from eastern facilities to western facilities, away from the saltwater interface, was recommended for some coastal public water supply utilities in the LEC, Planning Area which are expected to experience an increased threat of saltwater intrusion. The Restudy recommended that a portion of demand should be shifted inland for the following utilities: Riviera Beach, Lake Worth, Lantana, Manalapan, Boca Raton, and Florida City. The volume shifted depended upon the degree of saltwater intrusion, but is generally proportional to the increase in demands between the 1995 existing conditions and the 2050 future without plan conditions. Eastern wellfields at Miramar, Hollywood, Broward County 3A, 3B, and 3C, Dania Beach, and Hallandale are assumed to be on standby with the entire demand met from western facilities.

The coastal wellfield operations evaluated as part of the *LEC Regional Water Supply Plan* indicate that fewer utilities and less demand may need to be shifted inland or to alternative sources of water to avoid an increased threat of saltwater intrusion. The wellfields that continue to indicate an increased threat of saltwater intrusion or may not be able to meet a 1-in-10 year level of certainty in 2020 are Lantana, Lake Worth, Manalapan, Boca Raton, Broward 3A, 3B, and 3C, Hollywood, Dania Beach, Hallandale Beach, North Miami, and North Miami Beach. Their projected 2020 demands may not be able to be met at their current wellfield locations. Additionally, the incremental runs of 2005, 2010, and 2015 indicated superior performance when utilizing the same wellfield distribution in LEC-1. To meet the 1-in-10 year level of certainty and reduce the threat of saltwater intrusion in the near-term, the identified demands may need to be shifted from coastal wellfields as soon as possible. The individual utilities may consider other water supply options and the District is proposing a water resource development project in which the utilities in southeastern Broward County cooperatively develop additional wellfield and treatment capacity.

### **Caloosahatchee Water Management Plan Recommendations to CERP**

The Caloosahatchee Water Management Project (CWMP) identified the need for storage within the basin using a regional optimization approach with underground storage of such amount that the ASR systems will tolerate extended withdrawals of 220 MGD and 220,000 acre-feet in above ground storage (reservoirs plus other storage options). The analysis in the CWMP indicates that more detailed evaluation using more site-specific information may result in changes to the sizing and combination of this storage and recommends that the detailed evaluation be continued as part of the Southwest Florida Study (SWFS).

Five types of potential storage options or components were identified: reservoirs (regional and distributed), ASR, backpumping to Lake Okeechobee, in-river storage due to structure S78.5, and water table harvesting. The five storage components were combined into nine alternatives that were evaluated utilizing reduced flows from Lake Okeechobee as modeled in the LEC 2020 with Restudy alternative simulation. Of these

components, model results indicate that backpumping has limited utility or benefit and therefore, is not practical, based on the assumptions in the CWMP. Addition of a structure, in the Caloosahatchee River (\$78.5) and water table management showed minimal benefit, but may be considered as part of an overall storage strategy. Reservoirs (regional and distributed) and ASRs showed the greatest potential for meeting the storage needs in the Caloosahatchee Basin and are recommended for additional investigation and pilot testing within the basin.

Detailed assessment of the potential storage components is needed to identify a preferred alternative for meeting the demands in the Caloosahatchee Basin in 2020. It is recommended that the detailed assessment be completed as a part of the implementation of the SWFS.

The modeling conducted to evaluate the performance of various storage components utilized revised Caloosahatchee Basin hydrology and demands. Compared to previous assessments conducted for the Restudy, this assessment showed higher demands and lower runoff from the basin, and consequently less water was available to be placed in storage. The CWMP evaluated options that focused on additional storage within the basin coupled with limited water supply deliveries (matching the results of the Restudy) from Lake Okeechobee. Under these assumptions the proposed water supply backpumping option performed poorly. It is recommended that the SWFS and the analysis by the CERP RECOVER process further investigate the recommendations of the CWMP concerning in-basin storage and backpumping for storage in Lake Okeechobee (coupled with reasonable assurances of adequate deliveries from the lake to the Caloosahatchee Basin) to confirm the best combination that meets the cost-effectiveness, water supply, and environmental goals for the LEC Planning Area and the Caloosahatchee Basin.

The SWFS needs to be completed and implemented to address freshwater discharges to the Caloosahatchee Estuary and increase surface water availability for water use. The recommendations of the CWMP and the Restudy and associated funding should be pursued after detailed modeling supports the recommendation in the CWMP and CERP.

An evaluation of projected flows to the Caloosahatchee River was conducted via the LEC Regional Water Supply Plan and the CWMP for 1990 and 2020 base case conditions. The results of these evaluations indicate that the proposed MFL criteria and the restoration base flow needs of the Caloosahatchee Estuary are not being met. Pursuant to the direction provided in Chapter 373.042 F.S., a recovery plan is provided in the LEC Regional Water Supply Plan. The recovery plan consists of design and construction of enhanced basin storage capacity using surface water, ASR, and reservoirs as described in the Restudy and refined through the CERP and SWFS.

Based on the recommended development of water management and storage infrastructure to effectively capture and store the surface water flows in the Caloosahatchee Basin, the projected surface water needs of the basin and the estuary can be met. Supplemental agricultural demands from surface water sources within the basin are estimated to increase from 230,000 acre-feet per year (200 MGD) based on 1995 land

use, to approximately 320,000 acre-feet per year (258 MGD) on average based on 2020 land use. Public water supply needs from the Caloosahatchee River are projected to increase from 13,000 (12 MGD) in 1995 to 18,000 acre-feet per year (16 MGD) on average by 2020. The environmental needs of the Caloosahatchee Estuary have been estimated at 450,000 acre-feet (400 MGD) while average flows to the estuary are estimated to be approximately 650,000 acre-feet per year (580 MGD) on average. Flow to the estuary in excess of needs can, therefore, be as high as 200,000 acre-feet per year (180 MGD) on average, which is adequate, too meet increased demand by 2020. It was also concluded that the evaluated components, once constructed, would be adequate to meet the demands in the basin during a 1-in-10 drought event.

The CWMP has identified that the future environmental, agricultural, and public water supply needs of the Caloosahatchee Basin and estuary can be met from a combination of basin storage options with limited deliveries from the Lake Okeechobee as identified in the South Florida Water Management Model (SFWMM) LEC 2020 with Restudy simulation. The evaluation of storage components conducted as part of the study show that components capable of providing short-term and long-term storage are required. The finding suggests that reservoirs (regional and distributed), as well as ASR systems, would form an integral part of any successful storage development within the basin. A pilot testing program should be developed to verify the feasibility and effectiveness of these storage methods within selected sites in the Caloosahatchee Basin through the SWFS.

#### **Recommendation 29: Comprehensive Everglades Restoration Program Recommendations from the CWMP**

The District should move forward with the implementation of the Caloosahatchee River ASR Pilot Project and the C-43 Basin Storage Project Implementation Report (PIR) as identified in the Restudy. The PIR, acquisition, design, plans, and specifications should be completed by 2005 for inclusion in the update of the CWMP, the LWC Water Supply Plan, and the LEC Regional Water Supply Plan.

#### **Recommendation 30: Caloosahatchee River ASR Pilot Project.**

##### **Discussion**

The District should work cooperatively with the USACE to site, design, construct, and operate a pilot regional ASR project. Recovery performance and additional information obtained from the construction of and cycle testing at this facility will guide the design of the regional ASR wellfield.

Cost: \$2,998,000 (SFWMD portion only)

Funding Source: SFWMD and USACE

Implementing Agency: SFWMD and USACE



**Table 90.** Estimated Schedule and Costs for the Implementation of the Caloosahatchee River ASR Pilot Project.<sup>a</sup>

| Recommendation    | Plan Implementation Costs (\$1,000s) |       |      |      |      |       |
|-------------------|--------------------------------------|-------|------|------|------|-------|
|                   | FY01                                 | FY02  | FY03 | FY04 | FY05 | Total |
| Pilot ASR Project | 250                                  | 2,300 | 280  | 84   | 84   | 2,998 |

a. Inkind service includes FTEs for design and implementation of the ASR Pilot Project and will be applied against the SFWMD's portion of the 50/50 cost-share requirement.

## Recommendation 31: C-43 Storage Project

### Discussion

The District should cooperate with the USACE in development of the Project Implementation Report (PIR), design, construction, and operation of a regional reservoir and ASR project within the Caloosahatchee Basin. A comprehensive geologic and geotechnical investigation should be completed, as a part of the PIR to provide the information needed to size and design the reservoir. Development of the PIR, land acquisition, design, plans, and specifications should be completed by 2005 and construction should be initiated in 2005.

Cost: \$138,094,000 (SFWMD portion only)

Funding Source: SFWMD and USACE (50/50 cost share)

Implementing Agency: SFWMD and USACE

**Table 91.** Estimated Schedule and Costs for the C-43 Storage Project.<sup>a</sup>

| Recommendation                  | Plan Implementation Costs (\$1,000s) |       |        |        |         |         |
|---------------------------------|--------------------------------------|-------|--------|--------|---------|---------|
|                                 | FY01                                 | FY02  | FY03   | FY04   | FY05    | Total   |
| C-43 Regional Reservoir Project | 2154                                 | 2,163 | 23,925 | 66,386 | 343,466 | 138,094 |

a. Inkind service includes FTEs for design and implementation of the Project Implementation Report and will be applied against the SFWMD's portion of the 50/50 cost share requirement.

## Recommendation 32: Southwest Florida Study

### Discussion

The District should work in cooperation with the USACE to initiate and complete the SWFS by the 2005 as recommended in the CERP. The modeling work that has been completed as a part of the CWMP should be used as the basis for development of a preferred alternative to meet the demands within the Caloosahatchee Basin in 2020.

The primary purpose of the SWFS should be to provide a framework in which to address the health of aquatic ecosystems; water flows; water quality (including appropriate pollution reduction targets); water supply; flood protection; wildlife and biological diversity; and natural habitat. Evaluations involving surface water availability for water supply purposes should be based on providing a 1-in-10 level of certainty from surface water as an optimal goal.

### **Subtasks**

- Task 32a. Complete problem identification/Project Study Plan (PSP) phase by October 2000.
- Task 32b. Complete development of a preferred alternative for the Caloosahatchee Basin by 2003.
- Task 32c. It is recommended that the demand projections that were developed for the CWMP form the basis for evaluation of demands in the Caloosahatchee Basin in the SWFS.
- Task 32d. The ISGM and other models that were developed to model the Caloosahatchee Basin should be incorporated into the SWFS and be utilized to evaluate the performance of water supply storage options, such as a distributed reservoir system. During the SWFS analysis, the CWMP demands and ISGM should be refined and updated as needed for evaluation of alternatives for meeting demands in the Caloosahatchee Basin in 2020.
- Task 32e. Continue development of the modeling tools that were developed for the CWMP. These tools include the ISGM (MIKE SHE), Agricultural Field-Scale Irrigation Requirements Simulation (AFSIRS)/WATBAL, and optimization models that were developed for the Caloosahatchee Basin.
- Task 32f. Continue the seepage study that was initiated during development of the CWMP.
- Task 32g. The Plan of Study for the SWFS should include an evaluation of the feasibility of constructing a distributed reservoir system. In addition, the District should investigate the feasibility of public/private partnerships for funding and implementing a distributed reservoir system.
- Task 32h. In some areas immediately adjacent to the CWMP Planning Area, distributed, small-scale reservoirs could be developed that can offer improved water resource management through increased environmental and flood protection, and increased surface water resource availability. This should be investigated in the SWFS.

Cost: \$5-6,100,000 (estimated) (SFWMD portion only)

Funding Source: SFWMD and USACE

Implementing Agency: SFWMD and USACE (50/50 Cost Share)

**Table 92.** Estimated Schedule and Costs for the Southwest Florida Study.

| Recommendation                   | Plan Implementation Costs (\$1,000s) |       |       |       |      |       |
|----------------------------------|--------------------------------------|-------|-------|-------|------|-------|
|                                  | FY01                                 | FY02  | FY03  | FY04  | FY05 | Total |
| Complete Southwest Florida Study | 1,000                                | 1,800 | 1,800 | 1,000 | 500  | 6,100 |

## Operational Recommendations

In addition to changes in the operation of the Central and Southern Florida Project (C&SF Project) necessary to accommodate the construction of proposed major water resource management features, interim system-wide operational plans will be required in order to meet the increasing demands of the region over the next 5 to 10 years. Variations in weather and hydrologic conditions, which affect the amount of water available in the system, will require more flexible operating policies to ensure that the optimum balance of the competing water resource needs is made.

Consistent operation of the C&SF Project in compliance with the approved operational criteria is a critical factor in assuring that the stated goals of the Project are met, and the expected water resource benefits to the region are provided. However, it is recognized that certain portions of the system may undergo periods of stress that are either unrelated to system operations or are in part caused by meteorological events that exceed the design capacity of the system. Therefore, it is necessary to incorporate a measure of flexibility into the operational criteria to accommodate operational deviations that could be applied to avoid or reduce potential impacts associated with extreme meteorological conditions.

District staff should reevaluate system-wide structure operations within the context of seasonal and multi-seasonal climate outlooks. This reevaluation should incorporate the flexibility to facilitate short-term operational deviations to address extreme meteorological events or unanticipated negative ecological responses. This reevaluation should also incorporate the use of a wide range of environmental, water supply, flood control and water quality performance measures that have been adapted to focus on real-time system operations. Furthermore, the implementation of these new criteria should be accompanied with the development of statistical risk assessment procedures and other real-time decision support tools. These system-wide operational protocols would be evaluated and approved by the District Governing Board, and submitted to the U.S. Army Corps of Engineers for NEPA compliance and ultimate incorporation into the Corps' Master Water Control Plan. It is further recommended that periodic public workshops be held to solicit input and provide information regarding system-wide conditions and operations.

## **Recommendation 33: System-Wide Operational Protocols**

### **Discussion**

Develop a comprehensive set of operational protocols that cover all of the existing and proposed components of the South Florida Water Resource Management System (SFWRMS). The SFWRMS covers the entire District area and includes the original components of the C&SF Project, supplemental Project structures constructed by the SFWMD, The Everglades Construction Project, as well as structures proposed by the District's water supply plans and the CERP. Furthermore, these protocols will implement recent and proposed programs and policies such as the following:

- Minimum Flows and Levels
- Rainfall-Driven Deliveries to the Everglades
- Water Shortage Plan
- Water Supply Plan Elements
- Modified Water Deliveries Project
- C-111 Project
- Everglades Construction Project
- CERP
- Lake Okeechobee Construction Project
- Others

The operational protocols will be implemented through Governing Board action and will be publicly reviewed in a workshop format.

### **Description:**

Operational criteria incorporates a number of interrelated elements into a comprehensive set of information that is used to develop real-time operational strategies and implement changes in structure operations in response to changing meteorological conditions:

***Operational Goals and Objectives:*** To ensure successful operation of the SFWRMS, an over-arching set of goals and objectives for the various components and sub-regions of the system is required. When exercising any available flexibility contained within the operational criteria, it is important to ensure that decisions on specific structure operations are focused to meet the stated objectives of the system. Therefore, a clear and concise set of goals and objects are critical to the successful implementation of the SFWRMS operational protocols.

**Real-Time Performance Measures:** Performance measures are a critical component to the success of the overall water resource planning process. They are used as

a means to evaluate and select a preferred water resource plan based on hydrologic simulations. Likewise, real-time operations require a set of performance measures that can be used to insure the successful implementation of the selected plan. These real-time measures can be used to identify problem areas and guide the staff in the development of real-time operational strategies that consider existing conditions in the context of changing meteorological and climatological outlooks. The performance measures should include success criteria for all significant environmental components, water shortage implementation, flood control management and water quality assessment.

**Decision Support:** Real-time operational decisions are predominantly “risk-based” assessments that utilize probabilistic estimates of rainfall and other relevant hydrologic and climatological conditions to develop the most prudent set of actions anticipated to meet the objectives of the water resource system. Therefore, a comprehensive decision support system that includes statistical position analysis tools, and other risk-based assessment protocols is required.

**Flexible Operating Criteria:** . Criteria governing individual structure operations are the most basic element of any water resource operating system. Generally, these criteria are very specific and contain limited flexibility. The criteria developed in support of the original C&SF Project accepted that there would be few, and relatively infrequent meteorological conditions that would impose serious environmental and socio-economic impacts to the region. However, because of the state of technology available in the 1950’s and 60’s, little could be done to foresee and react to environmental impacts that have driven much of today’s efforts to improve the water resource system’s performance. Future development of operational criteria must provide the capability to proactively react to rapidly changing climatological outlooks and environmental conditions. This flexibility should be guided by the goals and objectives of the various system element through the application of comprehensive performance measures and require periodic concurrence from the Executive Director and Governing Board depending on the situation. Public input should be frequently solicited on a periodic basis.

#### **Subtasks:**

- Complete the ongoing series of Regional Water Supply Plans through Governing Board approval.
- Develop alternative system-wide operational policies that meet the stated goals and objectives of the various programmatic efforts.
- Develop performance measures suitable for use in real-time operational decisions, which incorporate environmental, water supply, flood control and water quality elements.
- Develop suite of decision support tools that incorporate a probabilistic, “risk-based” assessment methodology.
- Finalize system-wide operational policies.
- Develop comprehensive public input process.

- Conduct public workshops on the proposed operational alternatives and seek a Governing Board decision.

### **Recommendation 34: Periodic Operational Flexibility**

#### **Discussion**

Develop a process to identify and implement short-term deviations to existing operational protocols that consider all of the existing and proposed components of the South Florida Water Resource Management System (SFWRMS). These deviations will cover the following geographic sub-regions:

- Upper Kissimmee Chain of Lakes
- Kissimmee River
- Lake Okeechobee
- Caloosahatchee River / Estuary
- St. Lucie River /Estuary
- Everglades
- Upper East Coast
- Lower East Coast
- Lower West Coast
- Lake Okeechobee Service Area
- South Miami-Dade Agricultural Area
- Florida Bay

#### **Description.**

The regional hydrologic simulations were not structured to accurately consider short-term operational deviations that might be required to mitigate specific sub-regional environmental, water supply, flood control or water quality situations. Therefore, a process to develop and implement short-term operational deviations must be initiated to ensure that every effort is made to meet the regional water resource goals in the next 5 to 10 years as the major elements of the LEC Plan and CERP are implemented. These deviations would be applied in a proactive manner utilizing long-range climate outlooks and real-time performance measures. This flexibility will consider both high water and low water conditions, and include temporary modifications to the Supply Side Management Plan for Lake Okeechobee. The development, implementation and effectiveness of these deviations would be facilitated through a public input process that includes periodic public workshops, executive office review and Governing Board presentation.

**Sub-Tasks:**

- Develop alternative short-term operational policies to evaluate the feasibility of various options that might be applied.
- Finalize a suite of alternative, short-term operational policies.
- Conduct public workshop on the proposed short-term operational alternatives and seek a Governing Board decision.

**Recommendation 35: Lake Okeechobee Vegetation Management Plan**

Over the last six years extreme wet periods have resulted in abnormally high lake levels for long periods of time. These extreme high water levels have resulted in impacts to lake water quality, loss of important littoral zone vegetation communities, and have been reported to affect its sport fishery. The majority of scientists who have conducted research on the lake generally agree that a natural drought period or man-induced drawdown of the lake over the next several years would provide a number of ecological benefits to the ecosystem. These benefits would include improved water quality, reestablishment of damaged littoral zone habitat, and improved wildlife utilization of the littoral zone.

The only negative environmental issue associated with a potential drawdown of the lake over the next five years is the near certainty of torpedo grass and melaleuca expansion within upper elevations of the littoral zone. Currently there are over 16,000 acres of torpedo grass that now infest the western littoral zone of the lake. These plants offer poor habitat for fish and wildlife due to their dense growth form and result in low oxygen levels within the water column. Researchers have speculated that if Moonshine Bay should become dry (lake stages less than 11 ft NGVD) this would allow the rapid expansion of this introduced exotic throughout this pristine area of the lake (SFWMD, 2000e).

The first sweep of melaleuca control efforts have been made throughout most of the littoral zone, but viable seeds remain in seed banks and within remaining melaleuca stands. In comparison to torpedo grass, melaleuca poses less of a threat to the lake since it is currently under an advanced level of management and has a slower rate of expansion.

To address this issue, the *LEC Regional Water Supply Plan* recommends the formation of a Lake Okeechobee Vegetation and Fire Management Team (LOVFMT) that will work in cooperation with the existing South Florida Interagency Fire Management Council. It will be the responsibility of the LOVFMT to develop a Lake Okeechobee Vegetation Management Plan designed to manage torpedo grass and melaleuca expansion within the lake by providing increased opportunity for control of this evasive species in anticipation of dry periods. This plan would consist of organizing the LOVFMT to take advantage of future predicted low lake stages through a combination of burn management and disking programs designed to remove old growth, which renders the plant more susceptible to herbicide treatment.

The District in cooperation with DEP and the USACE will develop an approved work plan to deploy helicopters, spray boats and herbicide field teams as necessary to conduct a large scale torpedo grass and melaleuca eradication program within the western littoral zone of the lake (including Moonshine Bay) if lake levels fall below 12 ft NGVD. This program will be implemented over the next five years to address the torpedo grass expansion problem and ensure that melaleuca will not become reestablished if the opportunity for low lake stages becomes eminent.

Cost: \$750,000

Funding Source: SFWMD, DEP, and USACE

## **Consumptive Use Permitting and Resource Protection**

Implementation of the *LEC Regional Water Supply Plan* through CUP and resource protection actions will take place consistent with Florida law, utilizing the assurances framework developed by the Governor's Commission for a Sustainable South Florida and included in the CERP.

### **Recommendation 36: Water Reservations**

#### **Discussion**

Water reservations need to be established where necessary to assure the public of the availability of water specific to locations for the protection of fish and wildlife or protection of public health and safety based on the discussion in Chapter 5. In Chapter 5, a legal, policy, and technical description of reservations and necessary implementation actions is provided.

#### **Subtasks**

- Task 36a. For all reservation locations, quantify water for reservation, based on incremental increases in water availability associated with the proposed implementation of water resource development projects; identify assumptions used in incremental reservation increases, including water resource development projects proposed to augment or create reservation water supplies; identify process for updating reservation rules in five-year increments if reservation based assumptions are changed or prove to be inaccurate
- Task 36b. Conduct rulemaking necessary to implement the reservations
- Task 36c. Conduct additional research to identify freshwater flow needs and define reservation demands for the Biscayne Bay, Florida Bay, and the Loxahatchee River, and subregional wetland systems in Broward and Palm Beach counties



Task 36d. Update the regional water supply plan in 2005 to incorporate the projected reservation demands, and to identify additional implementation measures for reservations.

Cost: The initial reservation rulemaking will involve existing technical, regulatory and legal staff at a total of 1.7 FTEs over the first two quarters of FY 2001. Additional research for the definition of reservations for Biscayne Bay, Florida Bay, the Loxahatchee River, and subregional wetland restoration, are funded under other initiatives in this plan. However, staff to support rulemaking for adoption of reservations for these additional areas is expected to be 0.5 FTEs by 2004. The \$125,000 estimated for the five-year duration of this program is directed towards the development of operation criteria for delivering the reservation water included in the rule(s).

FTEs: 1.7

Funding Source: SFWMD

Implementing Agency: SFWMD

**Table 93.** Estimated Schedule and Costs for Reservation of Water.

| Recommendation<br>Subtasks | Plan Implementation Costs (\$1,000s and FTEs) |     |      |     |      |     |      |     |      |     |       |     |
|----------------------------|---|-----|------|-----|------|-----|------|-----|------|-----|-------|-----|
|                            | FY01  |     | FY02 |     | FY03 |     | FY04 |     | FY05 |     | Total |     |
|                            | \$  | FTE | \$   | FTE | \$   | FTE | \$   | FTE | \$   | FTE | \$    | FTE |
| <b>TOTAL</b>               | 50  | 0.7 |      | 0.3 |      |     | 75   | 0.5 |      | 0.2 | 125   | 1.7 |

### **Recommendation 37: Establish Minimum Flows and Levels**

#### **Discussion**

Establish MFLs by rule prior to December 2000 in accordance with Florida Statutes 373.042. for Lake Okeechobee, the Everglades/WCAs, the Biscayne Aquifer (north of C-2 canal), and the Caloosahatchee River. Develop and establish MFLs for the Loxahatchee River and St. Lucie Estuary by 2001, for Florida Bay by 2003, and for Biscayne Bay, and the southern coastal Biscayne aquifer by 2004. Funding and manpower estimates are associated with the rulemaking and peer review process only. Funding and manpower associated with data collection and research are incorporated as separate recommendations.

#### **Subtasks**

Task 37a. Complete research on Biscayne Bay, Florida Bay, St. Lucie Estuary, and the southern coastal Biscayne aquifer

Task 37b. Finalize the MFL criteria development process

Task 37c. Incorporate proposed MFLs, and recovery and prevention strategies into the rulemaking process consistent with the dates for establishment identified above

Task 37d. Conduct public workshops on rule language, notice draft rule with FAW and seek Governing Board authorization of rule

Cost: \$80,000 over five years (peer review and rulemaking process only)

FTEs: 1.3

Funding Source: SFWMD

Implementing Agency: SFWMD

**Table 94.** Estimated Schedule and Costs for Minimum Flows and Levels

| Recommendation<br>Subtasks | Plan Implementation Costs (\$1,000s and FTEs) |     |      |     |      |     |      |     |      |     |       |     |
|----------------------------|---|-----|------|-----|------|-----|------|-----|------|-----|-------|-----|
|                            | FY01  |     | FY02 |     | FY03 |     | FY04 |     | FY05 |     | Total |     |
|                            | \$  | FTE | \$   | FTE | \$   | FTE | \$   | FTE | \$   | FTE | \$    | FTE |
| <b>TOTAL</b>               | 40  | 0.5 |      |     |      | 0.3 | 40   | 0.5 |      |     | 80    | 1.3 |

### **Recommendation 38:** MFL criteria for the Rockland marl marsh

#### **Discussion**

Everglades National Park staff have suggested the proposed interim MFL criteria for the Rockland marl marsh (ENP) may not sufficiently protect these wetlands from significant harm. Additional wetland research is proposed to confirm or refine the MFL return frequency criteria that will not cause significant harm to marl-forming wetland plant and animal communities. As part of the LEC water supply planning process, the District, ENP and USGS staff will jointly develop a work plan to conduct the necessary research needed to confirm or refine the proposed MFL return frequency criteria for the Rockland marl marsh. This work will also help to determine appropriate levels for reservations of water.

#### **Subtasks**

Task 38a. Select an interagency working group to develop the Rockland marl marsh MFL research plan

Task 38b. Develop the draft research plan and have it independently peer reviewed by November 2001.

Task 38c. Once the research plan has been approved, the District will include its portion of the cooperative agreement in its 2002 budget for Governing Board approval.

Task 38d. Implement the research plan by September 2002 with a final report delivered to the District by July 2005.

Cost: \$115,000

FTEs: 0.4

Funding Source: SFWMD

Implementing agencies: SFWMD, Everglades National Park and USGS

**Table 95.** Estimated Schedule and Cost for MFL Research for the Rockland Marl Marsh

| Recommendation<br>subtask | Plan Implementation Costs (\$1,000s and FTEs) |     |      |     |      |     |      |     |      |     |       |     |
|---------------------------|---|-----|------|-----|------|-----|------|-----|------|-----|-------|-----|
|                           | FY01  |     | FY02 |     | FY03 |     | FY04 |     | FY05 |     | Total |     |
|                           | \$  | FTE | \$   | FTE | \$   | FTE | \$   | FTE | \$   | FTE | \$    | FTE |
| Total                     | 15  | 0.1 | 100  | 0.1 |      | 0.1 |      | 0.1 |      | 0.1 | 115   | 0.5 |

### **Recommendation 39: MFLs for Florida Bay**

#### **Discussion.**

In response to recommendations made by Everglades National Park staff, Florida Bay was placed on the District's Priority Water Body List for establishment in 2003. A sufficiency review of the necessary technical information needed to develop MFLs for Florida Bay has been completed and is under review. A number of research projects are currently underway that will provide data for developing initial MFLs for Florida Bay. In addition, conceptual models of Florida Bay are being developed by the CERP RECOVER Team and may be used as a starting point for developing MFL criteria for Florida Bay. The District expects to develop initial MFL criteria for Florida Bay by 2003.

#### **Subtasks**

Task 39a. Complete the MFL sufficiency review for Florida Ba

Task 39b. Utilize existing research programs to collect the necessary stage, flow and salinity data needed to establish flow/salinity relationships for Florida Bay.

Task 39c. Finalize the development of conceptual models and use as a starting point for the development of MFL criteria for Florida Bay.

Task 39d. Utilizing the above information, develop and publish initial MFL technical criteria for Florida Bay. Have this technical document peer reviewed by an independent scientific peer review panel by March 2003.

Task 39e. Establish MFLs for Florida Bay by December 2003. Identify minimum flows and/or levels needed to prevent significant harm, and identify the amount of water needed to restore Florida Bay and establish a reservation of water to protect the ecosystem.

Cost: N/A

FTEs: N/A

Funding Source: SFWMD

Implementing agencies: SFWMD, Everglades National Park

**Table 96. Estimated Schedule and Cost for MFLs for Florida Bay**

|                        | Plan Implementation Costs (\$1,000s and FTEs) |     |      |     |      |     |      |     |      |     |       |     |
|------------------------|---|-----|------|-----|------|-----|------|-----|------|-----|-------|-----|
| Recommendation subtask | FY01  |     | FY02 |     | FY03 |     | FY04 |     | FY05 |     | Total |     |
|                        | \$  | FTE | \$   | FTE | \$   | FTE | \$   | FTE | \$   | FTE | \$    | FTE |
| Total                  |   |     |      |     |      |     |      |     |      |     |       |     |

#### **Recommendation 40: IMFL recovery strategies**

##### **Subtasks**

Task 40a. Complete the design, permitting, and construction of CERP related long-term recovery strategies

Task 40b. Develop and implement operational protocols for releasing water from regional storage, as conditions warrant, to prevent the MFL criteria from being exceeded prior to implementation of long-term recovery measures.

Task 40c. Complete rulemaking that: 1) Defines regional water supply to coastal service areas during 1-in-10 year drought conditions consistent with environmental restoration and water resource development implementation schedules; 2) addresses permit duration and limits on the amounts of reasonable new demands on regional water supply in five year increments; 3) establishes enhanced water conservation measures for water users; and 4) establishes water reservations for the Everglades system.

**Recommendation 41: MFL monitoring systems**

Monitoring systems must be established in order to implement MFL recovery and prevention strategies and conduct research necessary to further refine the ability to project when significant harm could occur. The monitoring systems will collect water flow, water level, and water quality data. Monitoring data is necessary to affect interim operational strategies and to gauge the success of MFL long-term recovery and prevention strategies.

**Recommendation 42: Consumptive Use Permitting, Rulemaking and Resource Protection projects****Discussion**

The District will continue conducting the rule development and rulemaking processes for the subjects listed in Chapter 5, section on Consumptive Use Permitting (CUP) and Resource Protection. These concepts are conceptually laid out in a series of white papers produced in 1999 and Districtwide rule development workshops were conducted on these rule concepts in February 1999.

**Subtasks**

- Task 42a. Develop draft rules for public review
- Task 42b. Conduct rulemaking workshops during the summer of 2000
- Task 42c. Revise draft language per public comments and Governing Board direction in order to produce final draft of the rule
- Task 42d. Notice final draft of the rule in FAW and schedule Governing Board adoption of the final draft rule in the fall of 2000<sup>1</sup>
- Task 42e. Modify ground water models for application to the CUP review process.

Cost: \$0

FTEs: 0.5

Funding Source: SFWMD

Implementing Agency: SFWMD

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1. The schedule for rule adoption will be subject to the possible third party challenges and concerns.

## Other Water Resource Projects

### **Recommendation 43:** Comprehensive water conservation program

#### **Discussion**

The District will develop and implement a comprehensive water conservation program to cultivate a conservation ethic in cooperation with water users, utilities, and local governments to promote water conservation and more efficient use of the water resources in the LEC Planning Area. The conservation program will incorporate continued development and compliance with water conservation ordinances, development and implementation of public education programs, use of alternative water sources, other conservation methods, and documenting new and existing water conservation efforts. The conservation program will encompass all uses, but should provide emphasis on the outside use of water and xeriscaping principles. This program and position will be implemented Districtwide and focus on urban areas and outdoor uses.

The creation of a water conservation coordinator position and provisions for fiscal incentives are envisioned as potential tools to establish the water conservation plan. This position will be created from an existing position. It will focus on the development of a comprehensive water conservation program and establishment of a strong water conservation ethic. The coordinator will also assist water users and utilities to further public education and to develop their own customized water conservation program and establish numeric efficiency goals that are cost-effective and achievable.

#### **Subtasks**

- Task 43a. Redirect an existing position to a water conservation coordination position
- Task 43b. Develop a comprehensive conservation plan in cooperation with water users, utilities, and local governments, including development of a goal and objectives, by September 2001. The conservation plan shall be capable of the following:
- Identification of inefficiencies in water use
  - Identification of projects and programs to improve water use efficiency through incentive and regulatory approaches
  - An evaluation of the effectiveness of various options in meeting the existing and projected needs of the project area
  - Identification of specific conservation measures that should be incorporated in the update to this plan
  - Development and implementation of public education programs
  - Assistance to local governments in development of water conservation ordinances, land use regulations, and compliance programs

- Optimization of use of the CUP Program and DRI review abilities to implement conservation

Task 43c. Identification of cost sharing or incentive programs

Task 43d. Development of numeric efficiency goals for each major user/project area

Cost: \$250,000 per year for 2001-2004 (LEC Planning Area portion only)

FTEs: 3.75(75 percent of Districtwide total)

Funding Source: SFWMD

Implementing Agency: SFWMD

**Table 97.** Estimated Schedule and Costs for the Conservation Program.<sup>a</sup>

| Recommendation<br>Subtasks                  | Plan Implementation Costs (\$1,000s and FTEs) |     |      |     |      |     |      |     |      |     |       |     |
|---|---|-----|------|-----|------|-----|------|-----|------|-----|-------|-----|
|   | FY01  |     | FY02 |     | FY03 |     | FY04 |     | FY05 |     | Total |     |
|   | \$  | FTE | \$   | FTE | \$   | FTE | \$   | FTE | \$   | FTE | \$    | FTE |
| Redirect evaluator/<br>coordinator position | 250   | 1.0 | 250  | 1.0 | 250  | 1.0 | 250  | 1.0 |      | 1.0 | 1000  | 5.0 |

a. Costs associated with the Alternative Water Supply Funding Program are addressed in the funding section of this chapter.

#### **Recommendation 44: Seawater Reverse Osmosis Treatment Facilities**

The District will conduct a study to determine the feasibility of colocating seawater reverse osmosis treatment facilities with coastal electrical power plants located within the District. This technology may ultimately prove to be an alternative technology to the current sources under consideration in this plan. It could possibly provide significant volumes of drinking water at moderate cost. Because the water source (seawater) is not affected by seasonal weather conditions, it provides a secure and stable source of potable water even during drought events.

The cost-effectiveness of this alternative will be compared to CERP components such as reuse and conventional ground water withdrawal and treatment. If costs prove favorable, a recommendation to begin implementation of the technology will be included in the LEC Regional Water Supply Plan 2005 Update, or as a plan amendment prior to the update.

##### **Subtasks**

Task 44a. Review existing seawater reverse osmosis data

Task 44b. Identify potential power plants within the LEC Planning Area

Task 44c. Evaluate water quality considerations of source, product, cooling, and reject waters

Task 44d. Determine compatibility of the reject water and discharge location with existing surface water bodies

Task 44e. Identify site environmental issues

Task 44f. Identify potential users/partners of the product water in proximity of the reverse osmosis plant.

Task 44g. Evaluate costs

Cost: \$250,000

FTEs: 0.5

Funding Source: SFWMD

Implementing Agency: SFWMD with participation by interested public water utilities

**Table 98.** Estimated Schedule and Costs for a Feasibility Study for Reverse Osmosis Treatment of Seawater.

| Recommendation<br>Subtasks |   | Plan Implementation Costs (\$1,000s and FTEs) |     |      |     |      |     |      |     |      |     |       |     |
|----------------------------|---|---|-----|------|-----|------|-----|------|-----|------|-----|-------|-----|
|                            |   | FY01  |     | FY02 |     | FY03 |     | FY04 |     | FY05 |     | Total |     |
|                            |   | \$  | FTE | \$   | FTE | \$   | FTE | \$   | FTE | \$   | FTE | \$    | FTE |
| a                          | Review and evaluate existing seawater R.O. data, and operating costs of proposed Florida seawater R.O. facilities. <sup>a</sup> |   |     |      |     |      |     |      |     |      |     |       |     |
| b                          | Identify potential coastal power plants within District <sup>a</sup>  |   |     |      |     |      |     |      |     |      |     |       |     |
| c                          | Evaluate water quality considerations of source, product, cooling, and reject waters.   | 50  | 0.1 |      |     |      |     |      |     |      |     | 50    | 0.1 |
| d                          | Compatibility of the reject water and discharge location with existing surface water bodies                                     | 50  | 0.1 |      |     |      |     |      |     |      |     | 50    | 0.1 |
| e                          | Identification of site environmental/land use issues.   | 50  | 0.1 |      |     |      |     |      |     |      |     | 50    | 0.1 |



**Table 98.** Estimated Schedule and Costs for a Feasibility Study for Reverse Osmosis Treatment of Seawater.

| Recommendation Subtasks |  | Plan Implementation Costs (\$1,000s and FTEs) |     |      |     |      |     |      |     |      |     |       |     |
|-------------------------|--|---|-----|------|-----|------|-----|------|-----|------|-----|-------|-----|
|                         |  | FY01  |     | FY02 |     | FY03 |     | FY04 |     | FY05 |     | Total |     |
|                         |  | \$  | FTE | \$   | FTE | \$   | FTE | \$   | FTE | \$   | FTE | \$    | FTE |
| f                       | Identification of potential users / partners of the product water in proximity of the reverse osmosis plant. | 50  | 0.1 |      |     |      |     |      |     |      |     | 50    | 0.1 |
| g                       | Evaluate cost  |   |     | 50   | .1  |      |     |      |     |      |     | 50    | 0.1 |
| <b>TOTAL</b>            |  | 200   | 0.4 | 50   | .1  |      |     |      |     |      |     | 250   | 0.5 |

a. To be completed in FY'00

### **Recommendation 45:** Reclaimed Water System in northern Palm Beach County

This project will examine the feasibility of meeting the unmet future demands for irrigation water in northern Palm Beach and Martin counties by conveying reclaimed water from central Palm Beach County. If determined feasible, an implementation project will be included when this plan is updated.

The District anticipates assuming the role of establishing the capital facilities to transport irrigation quality reclaimed water for private/public distribution and sale in areas of northern Palm Beach County and coastal Martin. Local utilities will develop the distribution network to end users and sale for use.

#### **Subtasks**

Task 45a. Develop a Statement of Work (SOW) to conduct feasibility analysis with input from representatives of local utilities and users

Task 45b. Conduct evaluation with local governments to determine feasibility of establishing building regulations for hookup where appropriate

Task 45c. Contract feasibility analysis

Task 45d. Review results of feasibility analysis and identify preferred alternative with input from representatives of local utilities and users

Cost: \$250,000

FTEs: 0.3

Funding Source: SFWMD, water users, and utilities in Palm Beach and Martin Counties

Implementing Agency: SFWMD

**Table 99.** Estimated Schedule and Costs for a Feasibility Study for a Reclaimed Water System for Northern Palm Beach County.

| Recommendation<br>Subtasks |   | Plan Implementation Costs (\$1,000s and FTEs) |     |      |     |      |     |      |     |      |     |                  |     |
|----------------------------|---|---|-----|------|-----|------|-----|------|-----|------|-----|------------------|-----|
|                            |   | FY01  |     | FY02 |     | FY03 |     | FY04 |     | FY05 |     | Total            |     |
|                            |   | \$  | FTE | \$   | FTE | \$   | FTE | \$   | FTE | \$   | FTE | \$               | FTE |
| a.                         | Develop SOW<br>Est. start date: 1/00<br>Est. finish date: 8/01                                | 50  | 0.1 |      |     |      |     |      |     |      |     | 50               | 0.1 |
| b-c                        | Conduct feasibility analysis<br>Est. start date: 10/01<br>Est. finish date: 9/02              |   |     | 100  | 0.1 |      |     |      |     |      |     | 100              | 0.1 |
| d                          | Review results of feasibility<br>analysis<br>Est. start date: 10/02<br>Est. finish date: 1/03 |   |     |      |     | 100  | 0.1 |      |     |      |     | 100              | 0.1 |
| <b>TOTAL</b>               |   | 50  | 0.1 | 100  | 0.1 | 100  | 0.1 |      |     |      |     | 250 <sup>a</sup> | 0.3 |

a. Costs for implementation to be determined in the feasibility study.

## **Recommendation 46: Indirect Aquifer Recharge**

### **Discussion**

The feasibility of recharging primary or secondary canals with wastewater treated to AWT standards in conjunction with a cooperative utility will be explored. The focus of this project will be on issues not currently considered in related CERP projects. If economical feasibility is found, a pilot project will be recommended in the update of this plan. Success of the pilot project will ultimately lead to the development of full scale projects throughout the region.

This source of water is expected to reduce the dry season demands on the regional system and serve as a source of water for recharging ground water and/or meeting local environmental demands. The project will be developed to identify and address regulatory requirements to move this use of water forward. FDEP will be part of the project team seeking to determine the appropriate treatment and timing of reclaimed water use. The reclaimed water recharge sources would be used only during dry conditions. Alternative, environmentally accepted disposal methods will continue to be necessary during the wet season.

### **Subtasks**

Task 46a. Form interagency project team consisting of the FDEP, Broward, Palm Beach, and Miami-Dade counties, and the District

Task 46b. Identify data collection needs

Task 46c. Collect data

Task 46d. Determine feasibility

Cost: \$250,000

FTEs: 0.3

Funding Source: SFWMD, county, or utility

Implementing Agencies: FDEP/SFWMD, county, or utility

**Table 100.** Estimated Schedule and Costs for the Aquifer Recharge Study.

| Recommendation         | Plan Implementation Costs (\$1,000s and FTEs) |     |      |     |      |     |      |     |      |     |                  |     |
|------------------------|---|-----|------|-----|------|-----|------|-----|------|-----|------------------|-----|
|                        | FY01  |     | FY02 |     | FY03 |     | FY04 |     | FY05 |     | Total            |     |
|                        | \$  | FTE | \$   | FTE | \$   | FTE | \$   | FTE | \$   | FTE | \$               | FTE |
| Aquifer Recharge Study | 100   | 0.1 | 100  | 0.1 | 50   | 0.1 |      |     |      |     | 250 <sup>a</sup> | 0.3 |

a. Implementation costs will be determined by the study.

## **Recommendation 47: High Volume Surface Water ASR Testing/Taylor Creek**

### **Discussion**

Currently the only ASR well with an USEPA authorized, aquifer exemption covering primary water quality parameters is owned by the District and is located by Taylor Creek in Okeechobee County. The well was permitted, constructed, and tested at a capacity of five-MGD during the late 1980s. Results of that testing suggest the mid-Floridan aquifer may be capable of receiving and storing surface water at much large injection rates than five MGD. It is recommended that the well be modified to support injection/recovery testing at rates of 20 MGD. The ability for wells constructed into the mid-Eocene portion of the Floridan aquifer to operate at 20 MGD versus five/ten MGD represents potential to save time and cost from the Lake Okeechobee ASR system recommended in the CERP.

The well is currently in disrepair and needs a FDEP underground injection operation permit, at a minimum, prior to additional testing. It is estimated that the cost to acquire permits, refurbish the well, and upgrade the pumping capacity would be \$750,000 and would take 12 months to complete. The costs to conduct the high capacity testing would be approximately \$100,000.

### **Subtasks**

Task 47a. Conduct baseline assessment of the well including compilation of all existing data and conducting a casing integrity test on the production well, determine feasibility to proceed, and file application for FDEP permits

Task 47b. Prepare specifications for well rehabilitation, injection pump upgrade, and testing protocol

Task 47c. Contract for either construction or abandonment based on above evaluations

Task 47d. Conduct high capacity testing

Task 47e. Incorporate results into CERP designs

Costs: \$750,000 for construction; \$100,000 for testing

FTEs: 6 (3 per year for two years)

**Table 101.** Estimated Schedule and Costs for High Volume Surface Water ASR Testing/ Taylor Creek.

| Subtask |  | Plan Implementation Costs (\$1,000s and FTEs) |     |      |     |      |     |      |     |      |     |                  |     |
|---------|--|---|-----|------|-----|------|-----|------|-----|------|-----|------------------|-----|
|         |  | FY01  |     | FY02 |     | FY03 |     | FY04 |     | FY05 |     | Total            |     |
|         |  | \$  | FTE | \$   | FTE | \$   | FTE | \$   | FTE | \$   | FTE | \$               | FTE |
| a       | Baseline assessment                      | 100   | 0.5 |      |     |      |     |      |     |      |     | 100 <sup>a</sup> | 0.5 |
| b       | prepare specifications                   | 50  | 1.0 |      |     |      |     |      |     |      |     | 50               | 1.0 |
| c       | issue contracts and construct facilities | 600   | 1.5 |      |     |      |     |      |     |      |     | 600              | 1.5 |
| d       | high capacity testing                    |   |     | 100  | 2   |      |     |      |     |      |     | 100              | 2   |
| e       | Incorporate results in CERP              |   |     |      | 1   |      |     |      |     |      |     |                  | 1   |
|         | TOTAL                                    | 750   | 3   | 100  | 3   |      |     |      |     |      |     | 850              | 6   |

a. Results of assessment will determine construction or abandonment costs

## WATER SUPPLY DEVELOPMENT PROJECTS

Some wellfields that continue to indicate an increased threat of saltwater intrusion or may not be able to meet a 1-in-10 year Level-of-Certainty in 2020. These are Lantana, Lake Worth, Manalapan, Boca Raton, Broward 3A, 3B, and 3C, Hollywood, Dania Beach, and Hallandale Beach. Their projected 2020 demands may not be able to be met at their current wellfield locations. Additionally, a few utilities may meet the 1-in-10 year Level of Certainty but may not meet CUP criteria. These include Seacoast, Jupiter, Riviera Beach, Pompano Beach, Boca Raton, Miami-Dade's proposed South Regional and West wellfields, North Miami Beach, North Miami and Homestead. The incremental runs of 2005, 2010, and 2015 indicated superior performance when utilizing the same wellfield distribution in LEC-1. To meet the 1-in-10 year level-of-certainty and reduce the threat of saltwater intrusion in the near-term, the identified demands may need to be shifted from coastal wellfields. The individual utilities may consider other water supply options. Modeling confirmed that alternative sources are available. Chapter 5 also identified quantities of water available by each water supply option. The analysis concludes that the

water supply options can be considered a menu from which local water users should select from any combination of sources to meeting their individual water needs.

#### **Recommendation 48: Water Supply Development**

The recommendation of this plan is that individual water users evaluate alternative water supply sources and select the alternative, or combination of alternatives, which best suits local conditions. The District will continue to evaluate consumptive uses for their impacts on both the regional system and local resources on a case-by-case basis.

### **RELATIONSHIP OF PROJECTS TO THE FIVE-YEAR WORK PROGRAM**

The District is required to prepare a five-year water resource development work program every year. This report, submitted to FDEP, documents the District's progress in implementing water supply plan recommendations. The time frame for the work program is a five-year minimum. For each recommendation or strategy, the work program will provide the following information:

- The total cost to the District of the project
- An estimate of the amount of water to become available by implementation of a project
- Funding source(s)
- Implementing agency or agencies
- A summary of any changes to the recommendation since the plan was implemented
- Timetables

The recommendations in this plan will be incorporated into the *2000 Five-Year Water Resource Development Work Program* after Governing Board approval

### **FUNDING**

This section addresses the funding strategy and options for implementation of the LEC Regional Water Supply Plan. The approach takes into account the requirements of Chapter 373, F. S., feedback and comments from the LEC Regional Water Supply Plan Advisory Committee, and input from District staff. Chapter 373 requires water supply plans to include a funding strategy that is reasonable and sufficient to pay the costs of constructing or implementing all of the water resource development projects.

In general, the funding approach is divided into two major categories: water resource development and water supply development. The water resource development category addresses funding for projects that are primarily the responsibility of the District.

Water supply development projects, on the other hand, are primarily the responsibility of local governments, utilities, and other water users. However, information is included on programs that target funding of water supply development projects in general.

## Water Resource Development

Water resource development projects are generally regional in nature and are primarily the responsibility of the District. The water resource development projects for the LEC Planning Area were itemized earlier in this chapter. In addition, pursuant to Chapter 373, F.S., each water management district governing board is required to include in its annual budget the amount needed for the fiscal year to implement water resource development projects, as prioritized in its regional water supply plans. In addition to this plan, the District is also completing regional water supply plans for two other planning areas (Lower West Coast and Kissimmee Basin planning areas) while approaching the third year of implementation of the Upper East Coast Water Supply Plan.

Besides implementation of the water supply plans, the District is initiating implementation of the 7.8 billion dollar CERP, a cost-shared effort with the USACE. It is anticipated that most of the District's financial resources will be used for this project. The Governor's proposal for funding CERP projects is subject to legislative action, and a final funding recommendation is deferred pending legislative approval. Once a funding agreement is approved, an independent state process has been created under Chapter 373.1501 F.S. for authorizing CERP projects at the state level. At that time, a five-year funding plan will be established and administered by FDEP.

Current ongoing projects may qualify for a portion of the Districts funding responsibilities through the identification as in-kind contributions. It is not known to staff at this time the impact that these efforts will have on the District's resources in the future. Consequently, this plan is unable to commit to implementation strategies beyond the current budget year. The recommendation tables in the plan show the costs of the projects and potential sources of funding. Furthermore, taxing strategies exist that have not been implemented or identified as potential sources of funding. Time frames for completing the projects are preliminary and are subject to funding availability in the future years.

Total cost to the District of the water resource development projects for this plan is dollars plus FTEs. The traditional funding source for these types of projects has been primarily *ad valorem* taxes. The nonCERP projects (most of those listed in this plan) will be ranked and prioritized along with projects in all other regional water supply plans during the annual District budget preparation, and funded as money is available. Priority considerations for a project include availability of a cost-share partner and if a project makes new water available. Sustainability of the regional system is also an important consideration of project prioritization.

Some of the recommendations in this plan are studies. These studies may result in construction projects at a later date. Funding associated with these will be addressed at

that time. Potential funding sources for water resource development include funds provided on a project-by-project basis by the District's budget.

## **Water Supply Development**

Water supply development projects are local in nature and generally involve the withdrawal, treatment, and distribution of water. Chapter 373 states that, "local governments, regional water supply authorities, and government owned and privately owned water utilities take the lead in securing funds for and implementing water supply development projects. Generally, direct beneficiaries of water supply development projects should pay the costs of the projects from which they benefit, and water supply development projects should continue to be paid for through local funding sources." It is not the intent that regional water supply plans mandate actions to be taken by local agencies, utilities, and other water users. Therefore, the overall theme of this section is to provide direction and assistance, but not to mandate directives to local governments or utilities.

Chapter 373 requires water supply plans to identify potential sources of funding for water supply development projects. In addition to funding the projects through utility rates, several other funding programs exist to assist local entities.

### **Water Resource Protection and Restoration Projects Funding Program**

On January 18, 2000, Governor Jeb Bush announced his proposal to finance the protection and preservation of Florida's water resources. The Governor's proposed budget provides 73 million dollars to fund water resource restoration projects, which include wastewater treatment plant upgrades and Stormwater Treatment Areas. This represents an increase of 38 percent over last year's water project funding.

Projects eligible for the funding must address such criteria as resolving violations of state water quality standards, preventing drainage and flood control problems, and resolving public health threats. Projects requesting funding for surface water restoration and wastewater improvements will be reviewed by the Water Advisory Panel to ensure eligibility.

The Governor created the Water Advisory Panel to ensure that efforts to protect and preserve Florida's water resources is priority-driven, objective, and policy based. Projects determined by the panel as meeting the criteria will be forwarded to the legislature for funding consideration. This process ensures that state dollars are providing needed and meaningful improvements to state water resources.

The featured project must be identified in a water management district or FDEP plan as part of a surface water restoration effort. In addition, storm water related restoration projects that have a flood component must be identified in a storm water mitigation master plan and have quantifiable flood protection targets. For wastewater facilities projects, grant recipients must have, or agree to adopt, an ordinance requiring

mandatory waste management hookup upon failure of individual systems. The sponsor, or recipient, of the wastewater facilities projects is expected to fund at least 25 percent of the total project costs.

### **Alternative Water Supply Funding Program**

Vastly increased demands on natural supplies of fresh water led the Florida legislature in 1995 to enact the Alternative Water Supply Grant Program to increase the potential for the development of alternative water supplies in the state; help utilities develop cost-effective reclaimed water supplies; and fulfill a public purpose to fund such programs. Since FY 1997, the District has funded 82 projects in its Water Resource Caution Areas (WCRAs) for a total of approximately 20 million dollars.

The Alternative Water Supply Funding Program is a cost-share program which provides a portion of funding for alternative water supply projects built by local, county, or private water purveyors. Since FY 1997, the District has provided funds for projects that save or offset millions of gallons of water everyday.

To be considered for this funding support, the project must be consistent with local government plans and must be located in a WRCA. The local government must require all appropriate new facilities within the project service area to connect and use the project's alternative water supplies. Funding support shall be applied only for the capital or infrastructure costs for the construction for alternative water supply systems and the project must fall within guidelines established by the District. The *LEC Regional Water Supply Plan* recognizes the importance of this program in meeting the future needs of the region.

### **Drinking Water State Revolving Fund Program**

The 1996 Amendments to the Safe Drinking Water Act authorized USEPA to award grants to states for capitalization of Drinking Water State Revolving Funds. These are intended to be a source of financial assistance to public water systems to achieve compliance with Drinking Water Regulations and protecting public health. States must provide matching funds equal to at least 20 percent of the grant.

There are two elements of a Drinking Water State Revolving Funds. The first element is establishment of a loan fund enabling a state to make below-market loans to public water systems for the construction of projects. (A public water supply utility can be publicly or privately owned, but some states have statutory or constitutional restrictions limiting funding for privately owned systems.) States must adopt a priority system, ranking projects based on considerations of public health, compliance, and affordability, and are required to fund to the maximum extent practical in priority order. The second element is the ability to provide set-aside money to assist public water supply in meeting regulatory requirements through direct assistance, loans, and/or state grants funding capacity development, source water assessment, source water protection, and operator certification.



## SUMMARY OF RECOMMENDATIONS

**Tables 102** through **Tables 107** summarize each recommendation and project by its estimated annual cost.

**Table 102. Costs of LEC Interim Plan Recommendations by Year (\$000s)**

|    | Description                    | FY2001<br>(\$) | FY2002<br>(\$) | FY2003<br>(\$) | FY2004<br>(\$) | FY2005<br>(\$) | Total<br>FY01-05 | Total<br>FY06-20 |
|----|--------------------------------|----------------|----------------|----------------|----------------|----------------|------------------|------------------|
| 1  | Biscayne Aquifer Monitor       | 130            | 235            | 240            | 216            | 152            | 973              | 2280             |
| 2  | Floridan Model/monitoring      | 125            | 75             | 210            | 85             | 60             | 555              | *                |
| 3  | NPBC CWMP                      | 881            | 455            | 855            | 400            |                | 2591             | *                |
| 4  | E. Hillsboro ASR Pilot Project | 1500           | 170            |                |                |                | 1670             | *                |
| 5  | Site 1 Pilot Project           | 2220           | 800            | 300            | 100            |                | 3420             |                  |
| 6  | L.Worth Lagoon Min/Max         | 50             | 50             |                |                |                | 100              | *                |
| 7  | NE BC Recharge Network         | 150            | 550            | 600            | 600            |                | 1900             | *                |
| 8  | SE BC Intercon WS System       | 300            | 50             | 50             |                |                | 400              | *                |
| 9  | BC Urban Environ Enhanc        | 100            | 50             | 50             |                |                | 200              | *                |
| 10 | MD WASD ASR                    | 1500           | 1500           | 1500           | 1500           | 1500           | 7500             | 12000            |
| 11 | Biscayne Bay Min/Max Flow      | 200            |                |                |                |                | 200              | *                |
| 12 | Tribal Recommendation          | NC             | NC             | NC             | NC             | NC             | NC               |                  |
|    | TOTAL                          | 7156           | 3935           | 3805           | 2901           | 1712           | 19509            | 14280            |

\* Long-term cost projections dependent on the LEC Plan update in 2005

**Table 103. Cost of Other Federal, State, or District WRDPs by Year (\$000s)**

|    | Description                           | FY2001<br>(\$) | FY2002<br>(\$) | FY2003<br>(\$) | FY2004<br>(\$) | FY2005<br>(\$) | Total<br>FY01-05 | Total<br>FY06-20 |
|----|---------------------------------------|----------------|----------------|----------------|----------------|----------------|------------------|------------------|
| 13 | Critical projects (non-federal share) | 2130           | 2115           |                |                |                | 4245             | *                |
| 14 | Well Abandonment Program              | NC             | NC             | NC             | NC             | NC             |                  |                  |
| 15 | Saltwater Influence, Caloosahatchee   | NC             | NC             | NC             | NC             | NC             |                  |                  |
| 16 | ASR Permitting Issues                 | NC             | NC             | NC             | NC             | NC             |                  |                  |
| 17 | Mobile Irrigation Labs                | NC             | NC             | NC             | NC             | NC             |                  |                  |
|    | TOTAL                                 | 2130           | 2115           |                |                |                | 4245             |                  |

\* Long-term cost projections dependent on the LEC Plan update in 2005

**Table 104. Cost of CERP (Non Federal share) WRDPs by Year (\$000s)**

|       | Description                      | FY2001<br>(\$) | FY2002<br>(\$) | FY2003<br>(\$) | FY2004<br>(\$) | FY2005<br>(\$) | Total<br>FY01-05 | Total<br>FY06-20 |
|-------|----------------------------------|----------------|----------------|----------------|----------------|----------------|------------------|------------------|
| 18    | CERP (non-federal share) in LEC  | 75112          | 182510         | 228399         | 139280         | 120927         | 746228           | 2335964          |
| 19-28 | LEC Recommendations to CERP      | NC             | NC             | NC             | NC             | NC             |                  |                  |
| 29-32 | CERP (non-fed) in Caloosahatchee | 3404           | 6261           | 26004          | 67470          | 44050          | 147189           | 122735           |

**Table 105. Cost of Operational WRDPs by Year (\$000s)**

|    | Description                      | FY2001<br>(\$) | FY2002<br>(\$) | FY2003<br>(\$) | FY2004<br>(\$) | FY2005<br>(\$) | Total<br>FY01-05 | Total<br>FY06-20 |
|----|----------------------------------|----------------|----------------|----------------|----------------|----------------|------------------|------------------|
| 33 | System Operational Protocols     | NC             | NC             | NC             | NC             | NC             |                  |                  |
| 34 | Periodic Operational Flex        | NC             | NC             | NC             | NC             | NC             |                  |                  |
| 35 | L. Okeechobee Vegetation<br>Mgmt | 150            | 150            | 150            | 150            | 150            | 750              | *                |
|    | TOTAL                            | 150            | 150            | 150            | 150            | 150            | 750              |                  |

**Table 106. Costs of CUP and Resource Protection WRDPs by Year (\$000s)**

|    | Description               | FY2001<br>(\$) | FY2002<br>(\$) | FY2003<br>(\$) | FY2004<br>(\$) | FY2005<br>(\$) | Total<br>FY01-05 | Total<br>FY06-20 |
|----|---------------------------|----------------|----------------|----------------|----------------|----------------|------------------|------------------|
| 36 | Reservations              | 50             |                |                | 75             |                | 125              |                  |
| 37 | Minimum Flows and Levels  | 40             |                |                | 40             |                | 80               |                  |
| 38 | MFL - Rockland Marl Marsh | 15             | 100            |                |                |                | 115              |                  |
| 39 | MFL – Florida Bay         | NA             |                |                |                |                |                  |                  |
| 40 | MFL Recovery Strategies   | NC             | NC             | NC             | NC             | NC             |                  |                  |
| 41 | MFL Monitoring            | NA             | NA             | NA             | NA             | NA             | NA               | NA               |
| 42 | CUP Rulemaking            | NC             | NC             | NC             | NC             | NC             |                  |                  |
|    | TOTAL                     | 105            | 100            |                | 115            |                | 320              |                  |

**Table 107. Costs of Other WRDPs by Year (\$000s)**

|    | Description                | FY2001<br>(\$) | FY2002<br>(\$) | FY2003<br>(\$) | FY2004<br>(\$) | FY2005<br>(\$) | Total<br>FY01-05 | Total<br>FY06-20 |
|----|----------------------------|----------------|----------------|----------------|----------------|----------------|------------------|------------------|
| 43 | Conservation Program       | 250            | 250            | 250            | 250            |                | 1000             | *                |
| 44 | Seawater RO Co-location    | 200            | 50             |                |                |                | 250              | *                |
| 45 | NPB Reclaimed Water System | 50             | 100            | 100            |                |                | 250              | *                |
| 46 | Indirect Aquifer Recharge  | 100            | 100            | 50             |                |                | 250              | *                |
| 47 | Taylor Creek ASR           | 750            | 100            |                |                |                | 850              |                  |
|    | TOTAL                      | 1350           | 600            | 400            | 250            |                | 2600             |                  |

\* Long-term cost projections dependent on the LEC Plan update in 2005

NC - No District cost other than FTEs

NA - Not available

## SUMMARY OF IMPLEMENTATION SCHEDULES

Each Water Resource Development Project has a projected start and finish date as shown in the following table.

## ONGOING LEC INTERIM PLAN PROJECTS

| ID  | Task Name                                  | Rec | Benefit                       | Start       | Finish       | Cost        | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 |
|-----|--|-----|-------------------------------|-------------|--------------|-------------|------|------|------|------|------|------|------|------|------|------|
| I84 | Regional Saltwater Intrusion Mgmt          | 1   | Quantity                      | Thu 5/15/97 | Fri 9/30/05  | \$973,000   |      |      |      |      |      |      |      |      |      |      |
| I85 | Floridan Aquifer System GW Model           | 2   | Quantity, Timing              | Fri 1/2/98  | Fri 9/30/05  | \$555,000   |      |      |      |      |      |      |      |      |      |      |
| I86 | NPBC Comprehensive Water Mgmt Plan         | 3   | Quantity                      | Mon 6/3/96  | Thu 9/30/04  | \$2,591,000 |      |      |      |      |      |      |      |      |      |      |
| I87 | Eastern Hillsboro ASR Pilot Project        | 4   | Quantity, Timing              | Thu 9/9/99  | Fri 7/25/03  | \$1,670,000 |      |      |      |      |      |      |      |      |      |      |
| I88 | Hillsboro (Site 1) Reservoir Pilot Project | 5   | Quantity, Quality, Timing     | Mon 1/5/98  | Fri 12/24/04 | \$3,420,000 |      |      |      |      |      |      |      |      |      |      |
| I89 | Lakewoth Lagoon Min/Max Targets            | 6   | Quantity, Quality, Timing     | Mon 3/2/98  | Fri 5/31/02  | \$100       |      |      |      |      |      |      |      |      |      |      |
| I90 | N Broward Co Secondary Canal Network       | 7   | Quantity, Distribution        | Mon 7/1/96  | Tue 4/6/04   | \$1,900,000 |      |      |      |      |      |      |      |      |      |      |
| I91 | SE Broward Co Interconnected Water Sup Sys | 8   | Quantity                      | Thu 4/20/00 | Fri 7/18/03  | \$400,000   |      |      |      |      |      |      |      |      |      |      |
| I92 | Broward County Urban Envir Enhancement     | 9   | Quantity, Timing Distribution | Thu 4/20/00 | Fri 8/15/03  | \$200,000   |      |      |      |      |      |      |      |      |      |      |
| I93 | Utility ASR Miami-Dade Water & Sewer Dept  | 10  | Quantity                      | Wed 10/1/97 | Fri 9/23/05  | \$7,500,000 |      |      |      |      |      |      |      |      |      |      |
| I94 | Biscayne Bay Min/Max Flow Targets          | 11  | Quantity, Timing              | Mon 6/22/98 | Fri 6/20/03  | \$200       |      |      |      |      |      |      |      |      |      |      |
| I95 | Tribal Recommendation                      | 12  | Quantity                      | Wed 1/17/96 | Fri 9/26/03  | \$100       |      |      |      |      |      |      |      |      |      |      |

Task  Progress  Milestone  Summary 

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## OTHER FEDERAL, STATE OR DISTRICT PROJECTS

| ID   | Task Name                             | Rec | Benefit           | Start       | Finish      | Cost    | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 |
|------|---------------------------------------|-----|-------------------|-------------|-------------|---------|------|------|------|------|------|------|------|------|------|
| O96  | Critical Project - West C-4 Structure | 13  | Quantity, Quality | Fri 6/20/97 | Thu 6/20/02 | \$4,245 |      |      |      |      |      |      |      |      |      |
| O97  | Well Abandonment Program              | 14  | Quantity, Quality | Thu 4/20/00 | Wed 4/18/01 | \$0     |      |      |      |      |      |      |      |      |      |
| O98  | Salt Water Influence, Caloosahatchee  | 15  | Quantity, Quality | Thu 4/20/00 | Wed 4/18/01 | \$0     |      |      |      |      |      |      |      |      |      |
| O99  | ASR Permitting Issues                 | 16  | Quantity          | Thu 4/20/00 | Wed 4/20/05 | \$0     |      |      |      |      |      |      |      |      |      |
| O100 | Mobile Irrigation Labs                | 17  | Quantity          | Thu 4/20/00 | Mon 4/18/05 | \$0     |      |      |      |      |      |      |      |      |      |















